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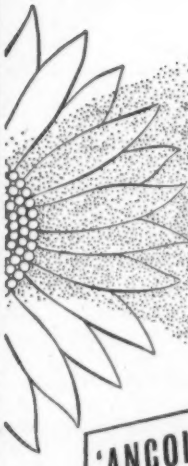

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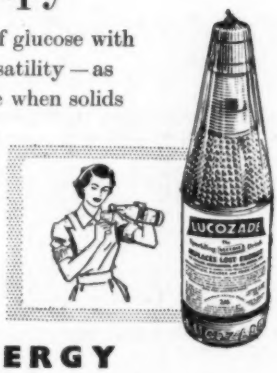

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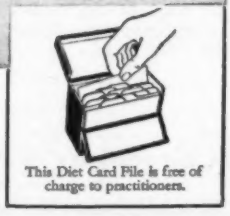

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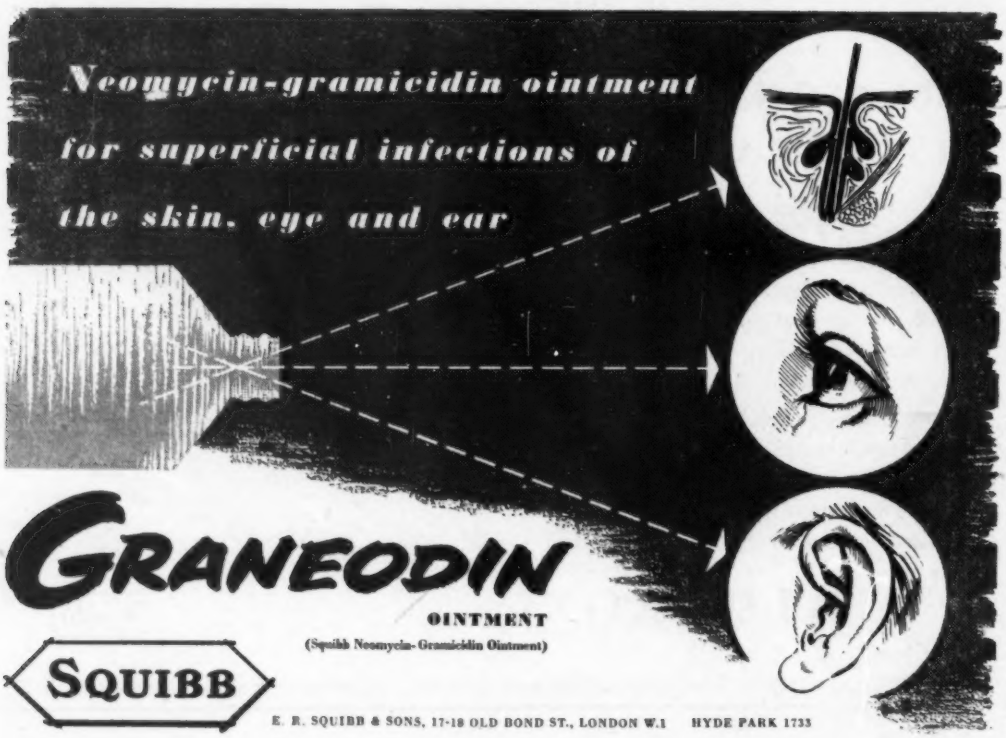

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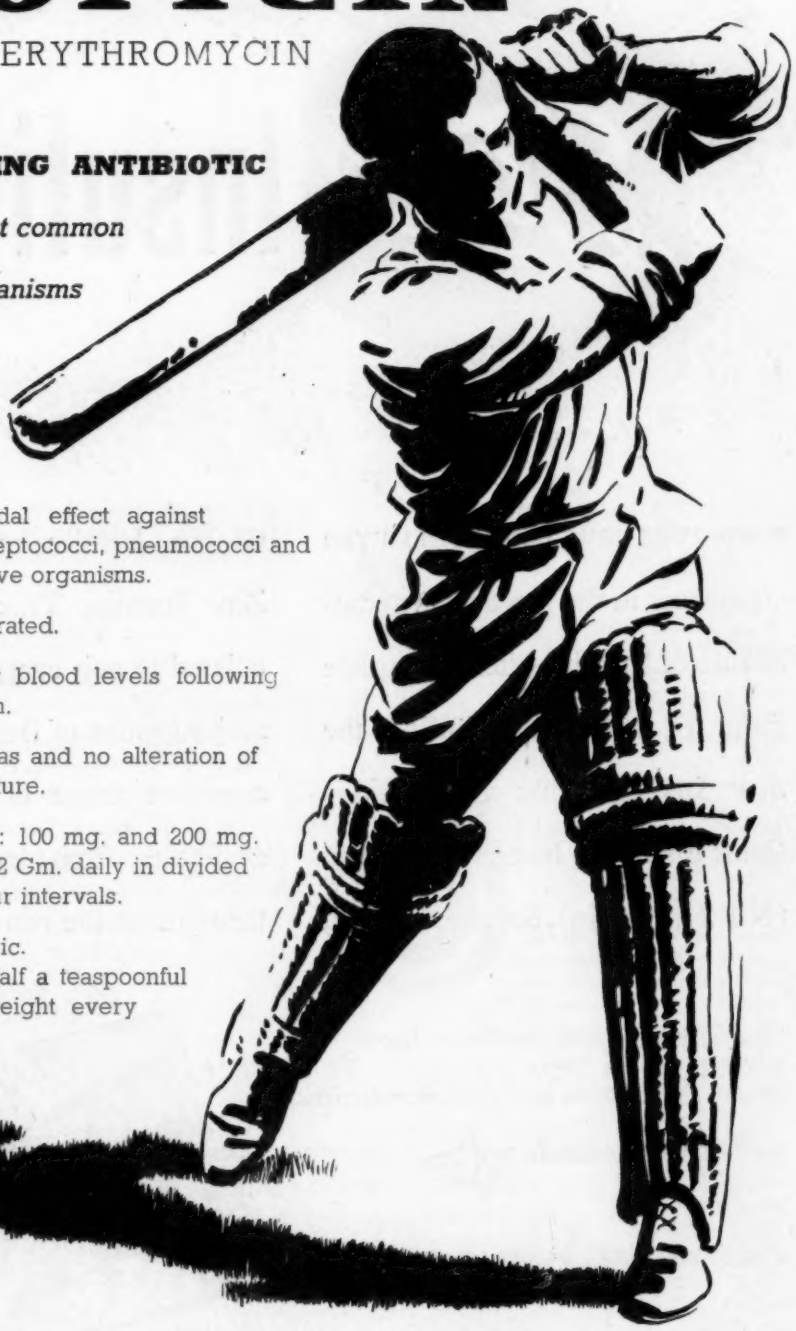

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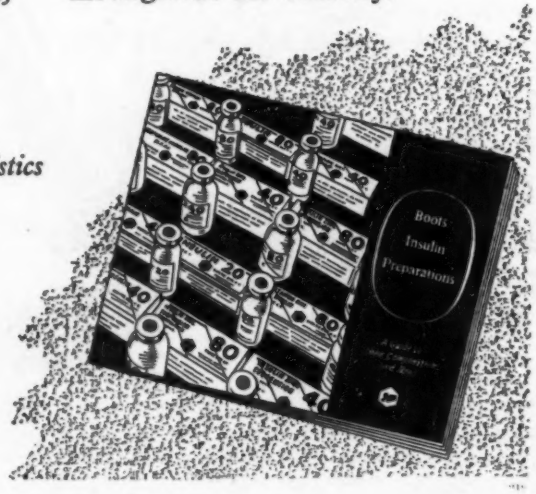

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NOTEWORTHY FEATURES:

- ★ An aqueous suspension, ready for use, is very speedily obtained when water for injection is added.
- ★ The prepared suspension is easy to inject, causes the minimum of pain and there is no risk of needle blockage.
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'Avloprocil' formulations have long been known to doctors for their high quality and reliability. **'Avloprocil' Dry** is the latest addition to the range. It presents the procaine salt of penicillin G as a stable, dispersible powder from which an aqueous injection can be readily prepared.

'Avloprocil' Dry can always be relied upon as an effective means of obtaining a sustained therapeutic level of penicillin in the blood.

A SUPERIOR PROCAINE PENICILLIN FOR INJECTION

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Available as: ***Single-dose*** *vials of 300,000 units*
Triple-dose *vials of 900,000 units*
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13

*Terramycin SF

BRAND OF OXYTETRACYCLINE WITH VITAMINS

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TERRAMYCIN S.F. and TETRACYN S.F. capsules provide in addition to the average daily adult dose of each antibiotic (1.0 g.) the specific therapeutic dosage of water soluble vitamins as well as vitamin K:

ASCORBIC ACID 300 MG. · THIAMINE MONONITRATE 10 MG.
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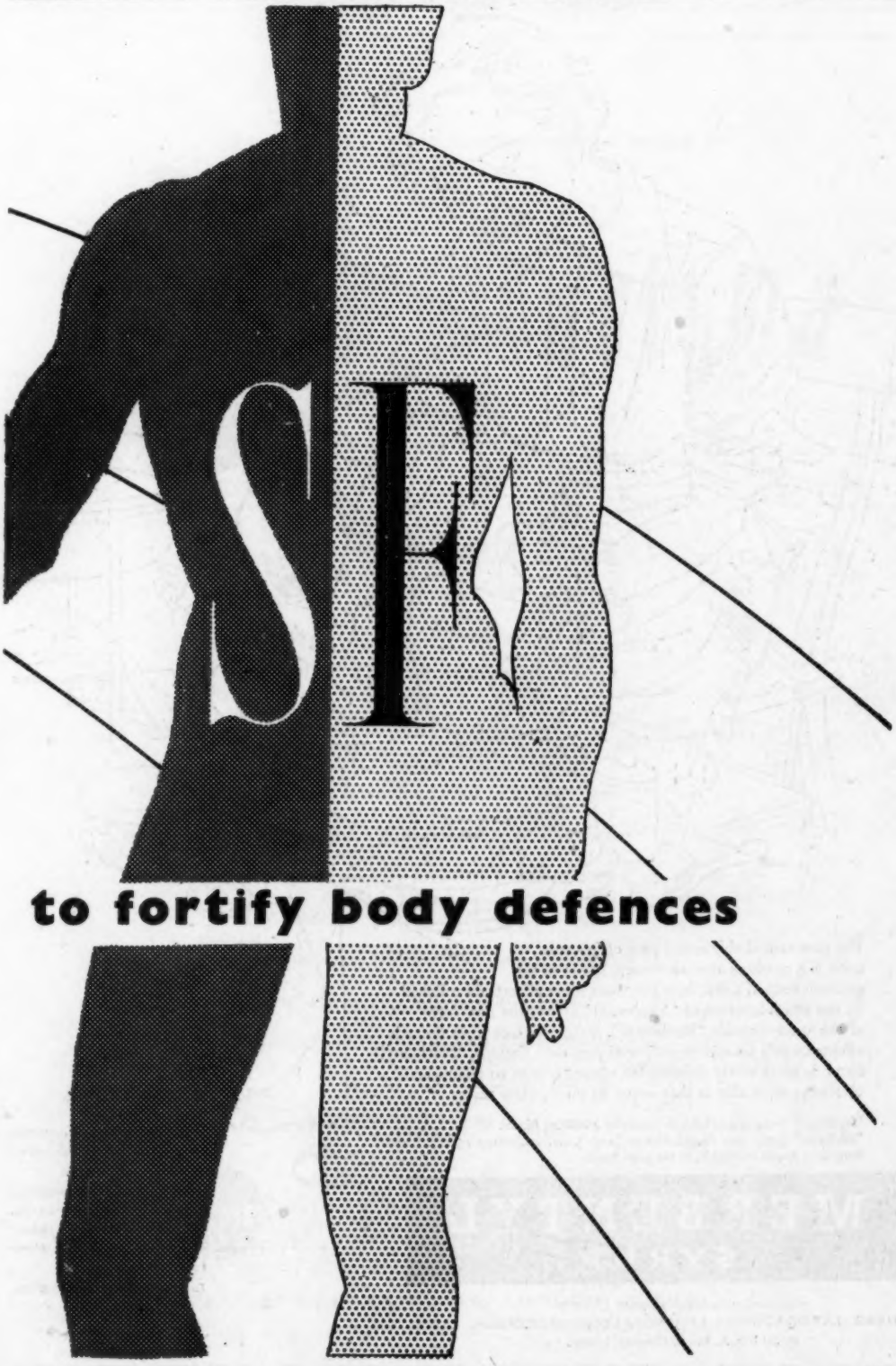
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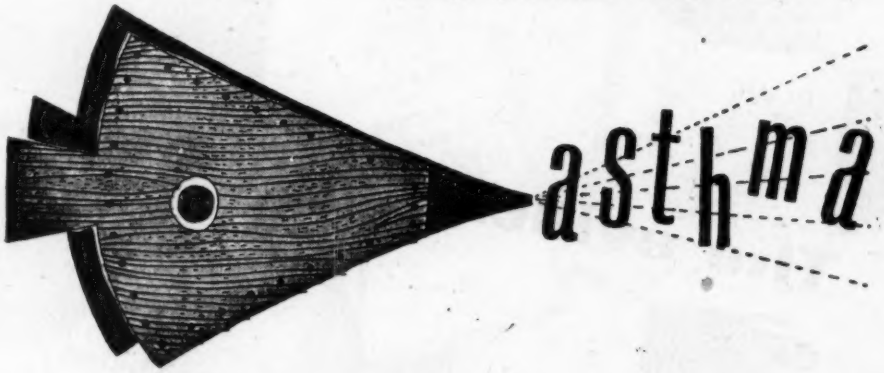
for symptomatic relief of



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Benazma is a pleasantly aromatic linctus for the symptomatic relief of asthma. It contains pseudo-ephedrine, an alkaloid that relaxes bronchial muscle in the same way as ephedrine but with a minimum of vasopressor activity and other side-effects. The formula, presented in a syrup base, includes stramonium to help maintain normal cardiac function, and codeine to minimise undue nervous stimulation and to depress the cough centre.

Bottles of 8, 20 and 80 Fluid ounces

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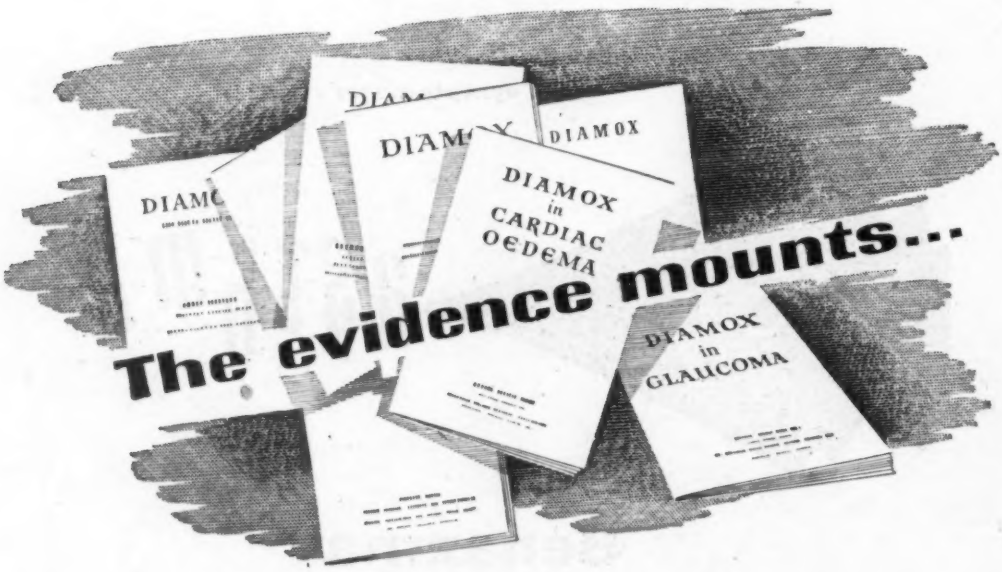

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POTENT SAFE ORAL DIURETIC

For the long-term treatment of cardiac oedema

Bottles of 25 and 100. 250 mg. tablets

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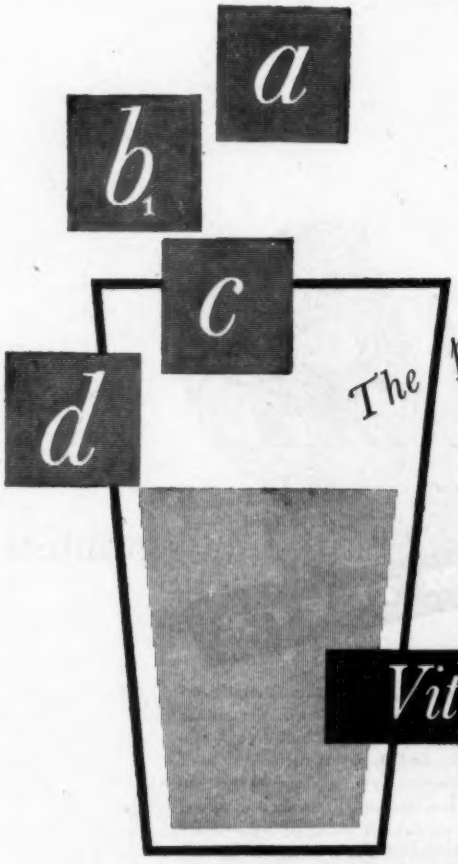

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(WITH LIQUID GLUCOSE)

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When a case calls for *reliable* and *agreeable* vitamin supplementation, Vitavel Syrup is the perfect prescription. It provides vitamins A, B_1, C and D—with liquid glucose—in a perfectly delicious orange base and is entirely free from any fishy or oily taste. It is so generally welcomed by both children and adults that it may always be prescribed in the firm assurance that the recommended dose will be *regularly* taken. Can be taken undiluted or with a *little* water or soda water.

One fluid ounce contains at time of manufacture:— VITAMIN A 20,000 i.u. VITAMIN D 3,000 i.u. VITAMIN B_1 4 mg. VITAMIN C 80 mg. LIQUID GLUCOSE, B.P. 25% w/v

Basic Price to N.H.S. 6 *fl. ozs.* 2/6 40 *fl. ozs.* 16/-

Other preparations for dietary supplementation include:

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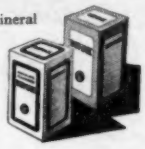
Stabilized wheat germ (Plain or Chocolate)

The richest natural vitamin-protein-mineral supplement, with a reliable content of B group vitamins, 27 per cent protein, 2.7 mg. iron per ounce, low sodium and low fibre. Easily digested and suitable for use in all bland diets.



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PREGNAVITE provides in a single preparation a comprehensive range of vitamins and minerals essential to maternal well-being throughout pregnancy and lactation.

Packs of 60 and 120 tablets
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The ox bile salts, sodium taurocholate and glycocholate, are present in a tablet of Veracolate to the amount of 1.07 grains. The official dose of bile salts is 2 to 6 grains, and the recommended dose of 3 tablets daily therefore places Veracolate in the officially recommended therapeutic range. Veracolate stimulates the secretory activity of the liver and is used in chronic cholecystitis, "liverish" and "bilious" attacks, and constipation.

FORMULA
Sodium taurocholate & glycocholate, each 1.07 gr., ext. cascara sagrada, 1.00 gr., phenolphthalein 0.50 gr., oleoresin capsicum 0.04 gr.
PACKING:
Bottles of 50 & 100 tablets; bottles of 500 tablets for dispensing purposes only, at 15/-, not subject to P.T

Veracolate

No Warner preparation has ever been advertised to the public.

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Effective diuretic therapy by oral administration is now made possible by MERCLORAN. One tablet three times daily, equivalent to 30 mg. mercury, is usually sufficient to keep cardiac patients free from oedema. Where more intensive treatment is needed MERCLORAN, being well tolerated by the majority of patients, can be taken more often and in increased doses. The need for injection is thus frequently eliminated.

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for the

treatment or prophylaxis

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Labyrinthine Disturbances

The value of " Dramamine " in the control of all forms of motion sickness is well established. More than this, however, it is now recognised that " Dramamine " is most effective in the control of other labyrinthine disturbances, so that it is indicated in the treatment or prophylaxis of any condition of abnormal stimuli of the tissues including end organs (gastro-intestinal tract, eyes) and their neural pathways to the labyrinth. Side-effects of " Dramamine " are so slight that dosage may be continued over long periods if necessary.

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Brand of dimenhydrinate

Thus conditions in which " Dramamine " has been most effective include vertigo due to hypertension, fenestration procedures and labyrinthitis ; Menière's syndrome, irradiation sickness, and in the symptomatic control of nausea and vomiting due to pregnancy, electro-convulsive therapy, narcotisation and certain drugs (antibiotics, etc.).

" Dramamine " may be administered orally, or rectally. It is supplied as 50 mg. tablets, in bottles of 12, 36 and 1,000 and in cartons (10 strips of 10 tablets).

Literature on request

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Ethical Pharmaceuticals since 1888

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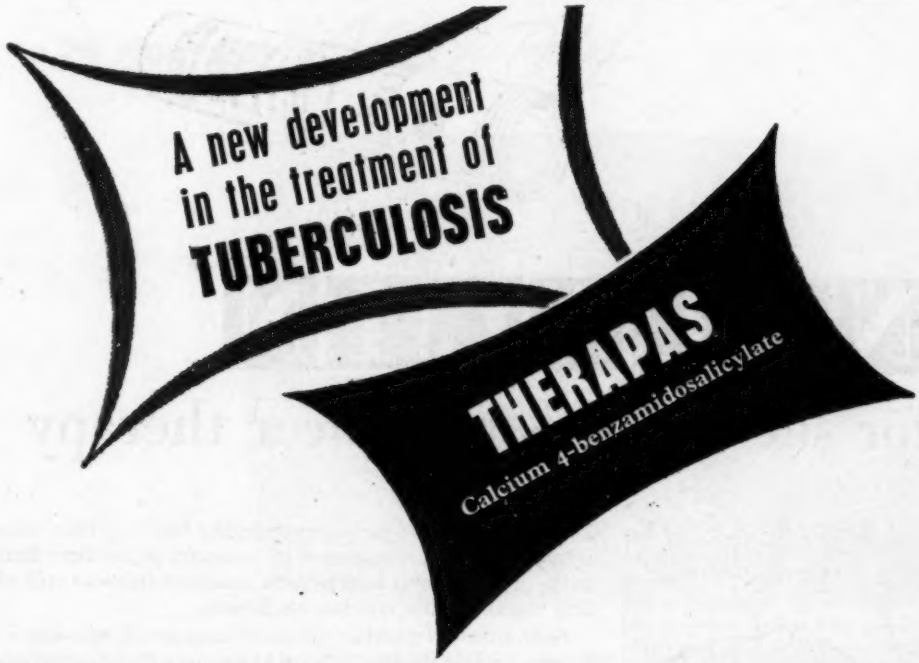


THERAPAS first synthesized in our laboratories in 1951, was introduced into tuberculosis therapy as an alternative to P.A.S. Detailed pharmacological studies have been published in this country (1), and Swiss workers have produced evidence (2) that calcium 4-benzamido-salicylate has a therapeutic action *per se*.

Therapas delays the emergence of streptomycin resistance. Its value in the treatment of genito-urinary tuberculosis is well established (3), (4), (5). Unlike P.A.S. (to which it is converted in the body) it has a slightly sweet, not unpleasant taste.

Effective though **Therapas** has been in these respects, it now appears from recent work (6), shortly to be published, that it is of still greater importance. The results indicate that:

Therapas, in combination with isoniazid or streptomycin, gives satisfactory clinical and radiological results in the treatment of pulmonary tuberculosis.

Therapas is just as effective as P.A.S. in delaying the emergence of resistance to either isoniazid or streptomycin.

Therapas can be used wherever P.A.S. is indicated, and is better tolerated.

Dosage: **Therapas** may be administered in daily doses of 14 G.
Availability: Individual packets of 3.5 G. in boxes of 100 packets.
1·0 G cachets in containers of 100 and 500.
Bulk powder in containers of 100 G and 500 G.

(1) *J. Pharmacy & Pharmacol.*, 1953, **5**, 849.

(2) *Schweiz. Med. Wschr.*, 1955, **85**, 222.

(3) *Brit. Med. J.*, 1953, **1**, 95.

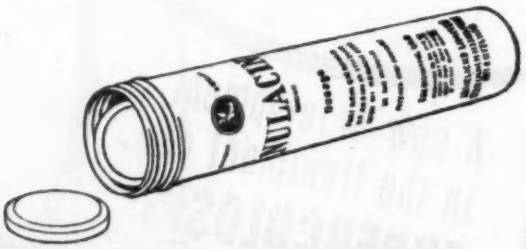
(4) *Brit. Med. J.*, 1953, **1**, 901.

(5) *Lancet*, 1955, **1**, 116.

(6) *In press.*

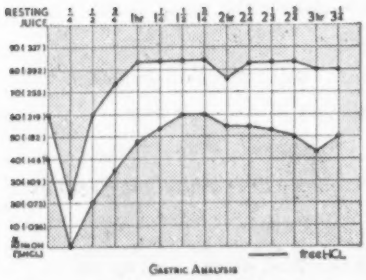
Further information and prices from
Smith & Nephew Ltd.
Welwyn Garden City, Herts.

S&N

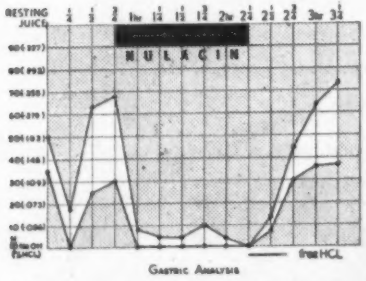


NULACIN

for successful peptic ulcer therapy



Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer



Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.

NEUTRALIZATION of gastric hyperacidity has long been acknowledged as the first requirement of successful peptic ulcer therapy. In the past it has only been possible to achieve this with milk-alkali drip therapy under hospital conditions.

Now NULACIN provides all the advantages of milk-alkali drip therapy without the discomfort of a tube and without inconvenience to the patient.

INDICATIONS

NULACIN tablets are indicated whenever neutralization of the gastric contents is required: in active and quiescent peptic ulcer, gastritis, gastric hyperacidity.

Beginning half-an-hour after food, a NULACIN tablet should be placed in the mouth and allowed to dissolve slowly. During the stage of ulcer activity, up to three tablets an hour may be required. For follow-up treatment, the suggested dosage is one or two tablets between meals.

NULACIN tablets are not advertised to the public and have no B.P. equivalent. May be prescribed on E.C.10. The dispensing pack of 25 tablets is free of Purchase Tax. (Price to pharmacists is 2/-). Also Available in tubes of 12.

NULACIN tablets are prepared from whole milk combined with dextrins and maltose, and incorporate Magnesium Trisilicate 3.5 grs.; Magnesium Oxide 2.0 grs.; Calcium Carbonate 2.0 grs.; Magnesium Carbonate 0.5 grs.; Ol. Menth. Pip. q.s.

BIBLIOGRAPHY:

The Control of Gastric Acidity, *Brit. Med. J.* 26th July 1952, 180-182

Medical Treatment of Peptic Ulcer, *Med. Press*, 27th February 1952, 195-199

The Effect on Gastric Acidity of "Nulacin" Tablets, *Med. J. Aust.* 28th November 1953, 823-824

Control of Gastric Acidity by a New Way of Antacid Administration, *J. Lab. Clin. Med.* 1953. 42:955

Further Studies on the Reduction of Gastric Acidity, *Brit. Med. J.*, 23rd January 1954, 183-184

Clinical Investigation into the Action of Antacids. *The Practitioner*, July 1954, 173:46

NULACIN

is available throughout the British Commonwealth, in the U.S.A. and many other countries. It is known as Nulactin in Canada and Sweden.

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8 to 24 Hours of *Allergy Relief*

Greater convenience and the economy of fewer doses—plus excellent allergy control and a low incidence of side-effects—are reasons why more and more allergy patients are being introduced to DI-PARALENE. Clinical reports attesting to the superiority of DI-PARALENE are many and may be summarized as follows:

GOOD PATIENT ACCEPTANCE—*In one study, for example, 69% of the patients reported* DI-PARALENE *afforded equal or better clinical results than other antihistamine agents which they had been using.*

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DI-PARALENE, with a piperazine base, is outstanding for the prolonged relief afforded by a single dose, ranging from 8 to 24 hours and sometimes longer. The initial adult dose is 50 mg. three times daily, and in most cases this may soon be reduced to one or two doses daily.

Remember DI-PARALENE *for prolonged relief with fewer side-effects, 50 mg. Filmtabs are available in bottles of 25, 100 and 500.*

PRESCRIBE ABBOTT'S LONGER-ACTING ANTIHISTAMINE

Di-Paralene Reg'd. Abbott (CHLORCYCLIZINE HYDROCHLORIDE, ABBOTT)

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PACKINGS

Tablets: 0·5 g. in packings of 20, 100 and 500.
Syrup: 0·5 g. in 5 c.c. in bottles of 100 c.c. and 500 c.c.
Eye drops: (4% solution) in bottles of 10 c.c.

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THE ROCHE SULPHONAMIDE

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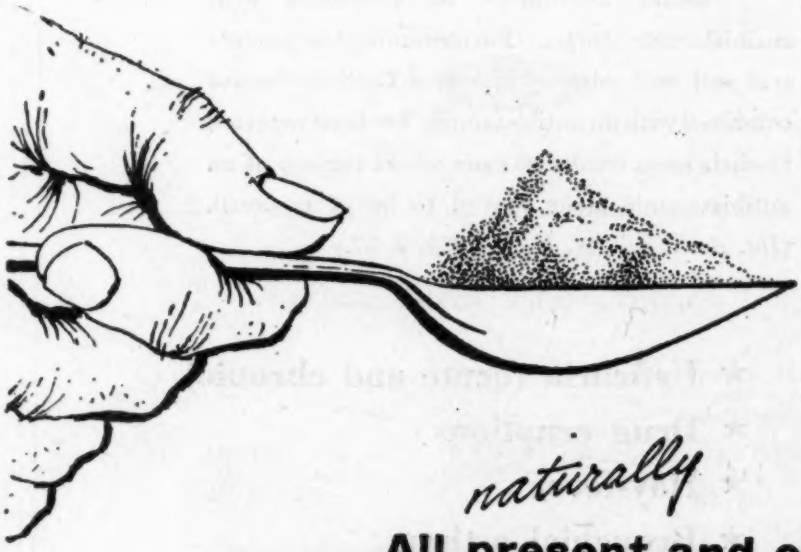
All the anti-anæmia factors in whole liver including the Vitamins of the B-complex, folic-acid and Vitamin B_{12} are naturally present in 'Pabyrn' Proteolysed Liver.



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Concentrated, palatable, easily assimilable; especially indicated in anæmias refractory to other hæmatinics; also as a high protein supplement. Literature and samples on request.

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(*calcium glucono-galacto-gluconate*)

is a useful alternative to treatment with antihistamine drugs. Furthermore, the parenteral and oral administration of Calcium-Sandoz combined with an antihistaminic has been reported to elicit good results in cases where the use of an antihistaminic alone proved to be of no avail. (*Int. Arch. Allergy, N.Y.*, 1952, **3**, 67.)

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Antrenyl

duplex

A SINGLE tablet with TWO PHASES of activity

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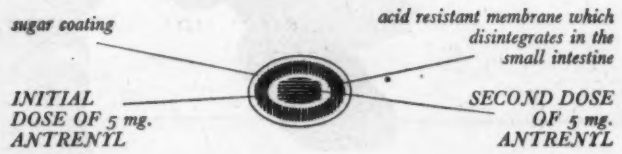
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acid resistant membrane which disintegrates in the small intestine
INITIAL DOSE OF 5 mg. ANTRENYL
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Two tablets daily provide four spaced doses for the relief of gastro-intestinal pain, particularly nocturnal pain in peptic ulcer

10 mg. Antrenyl 'Duplex' tablets in bottles of 25, 100 and 500

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'Antrenyl' is a registered trade mark denoting
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in more infections..

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TERRAMYCIN with its wider antibacterial range assures a greater chance of success in more infections than any other anti-infective agent.
There are tablets for adults, a palatable oral suspension for children, paediatric drops for infants and many other convenient forms for topical and parenteral use.
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(250 mg. per 5 cc.)
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Dispersible Powder
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For adults 'Histantin' is the product of choice, giving prolonged relief with a minimum of side-effects.
The new quick-acting antihistamine, 'Actidil', exerts its effect for about 12 hours and is also notable for low incidence of side-effects. 'Actidil' Elixir has been specially formulated and clinically tried for the treatment of allergic conditions in children.

'HISTANTIN', *50 mgm., is issued in bottles of 25, 100 and 500 at list prices (subject to usual discount) of 6/6, 24/6, 110/-.*

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INTERPRETATION OF INJURIES IN THE COMET AIRCRAFT DISASTERS

AN EXPERIMENTAL APPROACH

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ON the morning of Jan. 10, 1954, the Comet air-liner G-ALYP took off from Rome airport en route for London with 35 people on board. About twenty-five minutes later a sound like an explosion was heard, and the aircraft, in pieces, crashed into the sea near Elba. There were no survivors; but within about four hours 15 bodies were recovered from the sea in an area some $1^1/_4$ miles in diameter. All but 1 of the bodies were floating face downwards when found. 5 were naked or almost so, 4 retained only a few garments, and 6 were still well clothed. 11 of these people had almost certainly been in the rear part of the main cabin at the time of the disaster; and those who had occupied the back seats were more fully clothed when picked up than those from more forward positions. The bodies were taken to Elba, and between Jan. 12 and Jan. 14 all but 1 were subjected to detailed necropsy by Prof. A. Fornari, of Pisa.

On the evening of April 8 another Comet air-liner (G-ALYY) disappeared on a routine flight from Rome to Cairo with 21 people on board. The following evening 5 bodies were found floating on the sea near Naples and picked up by H.M.S. *Eagle*. As on the previous occasion, all but 1 floated face downwards. It is estimated that they were in the water for about twenty-two hours, including most of the daylight period of April 9. A 6th body was washed ashore ten days later at Paola. Of these bodies 1 was almost fully clothed, 1 was scantily clad, and the other 4 were practically naked. All were passengers from the rear part of the main cabin; the front seats had been unoccupied. The bodies retaining most clothing had again occupied the rearmost seats. 4 of the bodies were subjected to necropsy in England by Dr. Donald Teare on April 12 and 13, and the remains found at Paola were examined by the Italian authorities.

Many intricate investigations, spread over about nine months, were undertaken at the Royal Aircraft Establishment and elsewhere to find out the exact nature and basic cause of the disasters and hence to devise measures to prevent their recurrence. In this work the medical evidence assumed immediate importance owing to the absence, for some considerable time, of wreckage which would facilitate reconstruction of the Elba accident. Owing to the depth of the sea off Naples salvage operations were impossible, and no significant wreckage was forthcoming; consequently the medical evidence in this instance was of particular importance in so far as it showed that both accidents had essentially the same effects on the passengers.

The necropsy findings are of interest, quite apart from their place in the inquiry, owing to their somewhat unusual nature and the unique circumstances in which the injuries were sustained. In modern air-liners it is necessary to pressurise the cabin to protect passengers from the hazards of anoxia and decompression sickness at high altitude. At the time of the disasters both Comets had reached an altitude of about 30,000 ft. during the initial climb. At this height the air-pressure inside the cabin is about 7·5 lb. per sq. inch (388 mm. Hg) above that prevailing outside. In recent years there has been much speculation about the possible consequences of a sudden structural failure causing very rapid ("explosive") decompression. In particular, damage to the lungs has been feared owing to the rapid expansion of intrapulmonary gas (Armstrong 1936, Lovelace and Gagge 1946, Fulton 1948). Clearly such a possibility had to be considered in the Comet victims; for break-up of the fuselage at 30,000 ft., whatever the cause, would be accompanied by rapid decompression. Nevertheless any lesions due directly to decompression would be associated almost inevitably with others due to violent impact with parts of the aircraft or its furnishings. Another possibility was blast injury due to some kind of explosion. Moreover, all injuries inflicted in the aircraft might well have been complicated by the effects of a free fall from high altitude, by impact with the sea, and by effects of exposure while floating on the sea in the vicinity of the crash.

The medical inquiry had three main objectives: (1) to record all lesions found at necropsy; (2) to identify the cause of death; and (3) to ascertain, in accordance with these facts, the probable nature and sequence of traumatic events. We do not give a full description of the necropsy findings, because a brief summary of the outstanding features will serve as adequate introduction to the description of the necessary research with which we were primarily concerned.

The major injuries in all the bodies from both accidents were remarkably uniform. All but 5 of the 19 bodies examined had ante-mortem fractures of the skull; and 15 had similar injuries to the thoracic cage, mostly of exceptional severity. Spinal fractures and costo-vertebral dislocations were common. Limb fractures, found in 13 cases, were identified as predominantly post-mortem. Grave internal injuries were present in all the bodies even in those with little external injury. Thus, hæmothorax of 0·3–2·0 litres was present in 16 cases; and the lungs were severely damaged in all 19. In no case, however, was there evidence of drowning. The heart was ruptured in 4 bodies, and the great vessels were torn in 13. Intra-abdominal injuries were rather less common, but hæmoperitoneum (up to 1 litre) was present in 14 cases, and hepatic laceration or pulping was invariable. Only 5 cases had tears of the spleen. In addition, areas of altered skin were observed in 14 of the Elba victims and in 4 from Naples; in the former they were likened to burns or scalds, whereas in the latter the change was apparently in pigmentation.

Analysis of these findings led to the conclusion that three aspects of the problem needed special investigation if the medical evidence was to be of positive value in reconstruction of the accidents: (1) the ætiology of the pulmonary lesions; (2) the cause of the skin lesions; and (3) the feasibility of distinguishing between ante-mortem and immediately post-mortem injuries, with special reference to the effects of violent contusive trauma. This last point is important in any attempt to establish the time sequence.

Pulmonary Lesions

PATHOLOGY

Severe injury to the lungs was an invariable finding. The predominant naked-eye features were congestion, bruising, laceration, pulping, and areas of ballooning with subpleural bullæ.

Irregular lacerations of various depths were found in the lungs in most cases. They were usually confined to

the lower lobes, chiefly on the diaphragmatic surfaces, and sometimes extended into areas of complete pulping. Only occasionally could the lacerations be attributed to penetration by fractured ribs; they were prominent in the 2 cases in which the thoracic cage was intact. The margins of the tears were clearly hæmorrhagic in all but 2 cases. These 2 bodies (numbers 14 and 15 from Elba) also differed from the others in showing no hæmothorax. It seems likely that the pulmonary splits in these 2 cases occurred after the circulation had ceased.

Subpleural hæmorrhages and congestion were present to some extent in all instances, giving a mottled appearance to the surface. Slices showed that the hæmorrhagic zones often extended deeply into the lung, and that hæmorrhages were scattered throughout the pulmonary parenchyma. In no case did the subpleural hæmorrhages present a definite linear pattern of "rib-markings." In contrast with the dark areas of congestion and bruising, other parts of the lungs seemed unusually pallid, bloodless, and expanded. Tense subpleural bullæ occurred in these areas, especially in the upper lobes.

Portions of the lungs from 18 bodies were examined microscopically at Farnborough. The Elba specimens had been fixed in 10% formalin, and those from Naples in Zenker-formalin. Paraffin sections were stained for general histology with Ehrlich's hæmatoxylin and eosin, and by the Masson trichrome method. Wilder's silver technique was used for the demonstration of reticular fibres, and mucus was identified by the periodic acid-Schiff reaction. Other pieces of lung tissue from each body were embedded in gelatin by the procedure described by Baker (1946); frozen sections 15–25 μ thick were stained for neutral fat with alcoholic solutions of Sudan III and IV, or Fettrot 7B (Pearse 1954).

Extensive disorganisation of the finer structure of the lung was found in every case. The outstanding lesions were traumatic emphysema, hæmorrhage, vascular engorgement, and fat-embolism.

The most striking feature in the sections was the presence of adjacent large areas of emphysema and hæmorrhagic consolidation. So far as could be deduced from the samples taken for histology, these features were widely but not uniformly distributed throughout the lungs; in places the emphysema was massive, notably in the parts of the upper lobes where macroscopic bullæ had been observed at necropsy. The emphysema was clearly traumatic (figs. 1 and 2). In the affected parts the walls of alveoli, alveolar ducts, and respiratory and terminal bronchioles were torn, with consequent formation of irregular spaces varying greatly in size, the largest being about $^1/_4$ inch in diameter. Remnants of the torn alveolar walls projected into the spaces, and in sections stained by Wilder's method reticular fibres were seen protruding from the torn edges. As might be expected, such changes were not restricted to the pre-existing air spaces of the lung but were accompanied by interstitial emphysema due to the formation of direct communication between the air spaces and the connective tissues of the bronchovascular planes and interlobular septa. The subpleural bullæ were of this type, evidently caused by escape of air into the deeper layers of the visceral pleura (fig. 1). The severity and distribution of traumatic emphysema bore some relation to the normal anatomical pattern of pulmonary lobules. Thus, distended areas with great destruction of lung parenchyma were commonly adjacent to areas of collapse or of relatively normal lung and separated from them only by interlobular septa. Nevertheless collapse, hæmorrhagic consolidation, and emphysema could, in places, be seen side by side in the same lobule. In some cases the bronchi and bronchioles contained plugs of material including epithelial-cell debris, a few red blood-cells, and matter, presumably mucus, which stained with periodic acid-Schiff reagent (fig. 3).

In all but 2 bodies the blood-vessels and lymphatics of the lungs were congested. There was gross intra-

Fig. 2—Naples accident: body C. Alveolar disruption and intrapulmonary hæmorrhage in upper lobe of right lung. (Hæmatoxylin and eosin. ×52.)

pulmonary hæmorrhage, but this varied considerably from one part of the lung to another. Much of the blood seemed to have come from the innumerable disrupted capillaries, but arterioles and even small arteries were occasionally found opening directly into the air spaces. Over large areas the alveoli were completely packed with blood, giving a condition of hæmorrhagic consolidation or hepatisation; and in places the pleura was separated from the underlying parenchyma by extravasated blood. Some of the alveoli and emphysematous spaces also contained what appeared to be œdema fluid and amorphous debris. Bodies 14 and 15 from Elba, however, showed little evidence of intrapulmonary exudation or bleeding, although there were severe traumatic emphysema.

In several specimens there were early signs of post-mortem autolysis and putrefaction due to bacteria, which could be seen in the sections, particularly in regions of gross hæmorrhage. In these cases it was not difficult to distinguish between smooth-walled spherical spaces produced by the action of gas-forming organisms and the irregular cavities of traumatic emphysema.

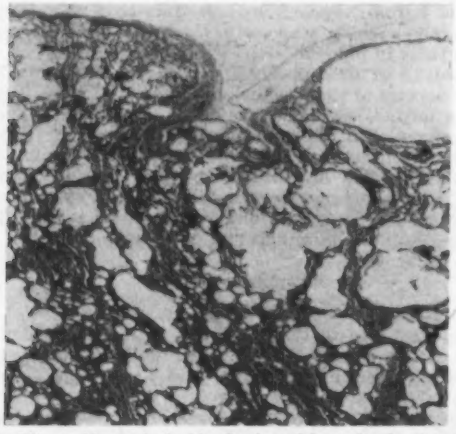

Fig. 1—Elba accident: body 14. Section of lung showing traumatic emphysema and a subpleural bleb. (Hæmatoxylin and eosin. ×13.)

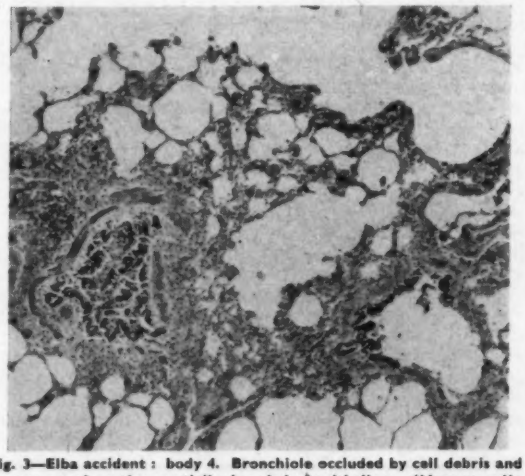

Fig. 3—Elba accident: body 4. Bronchiole occluded by cell debris and mucus, and another partially denuded of epithelium. (Hæmatoxylin and eosin. ×52.)

The frozen sections revealed pulmonary fat-embolism (fig. 4) in 12 bodies. The amount was small in most cases, but in 3 (2 from Elba and 1 from Naples) it was considerable. The quantity of intravascular fat observed in the few frozen sections examined from each case does not, of course, necessarily indicate the total embolic fat-content of the lungs, and must therefore be interpreted with due reserve. However, the mere presence of fat-embolism is of interest in so far as it might help to determine the sequence of injuries. It is unlikely that the fat originated within the lungs. Ante-mortem fractures are usually assumed to be the source of pulmonary fat-embolism, but this is not always so (Robb-Smith 1941). All 12 cases with which we are now concerned had fractures with local ante-mortem characteristics, but 1 case showing considerable fat-embolism was also 1 of the only 2 bodies with an intact thoracic cage, having ante-mortem fractures only of the skull.

The fat-embolism suggests that the pulmonary circulation was maintained for a finite time after the cranial or thoracic fractures were sustained. In 5 of these bodies all the vessels forming the vascular peduncle of the heart (including the pulmonary arteries) were either extensively torn or completely severed. We therefore suggest that these injuries to the great vessels occurred a sufficient time after the fractures for pulmonary fat-embolism to develop, and that during this time the intrapulmonary vascular bed was also largely intact.

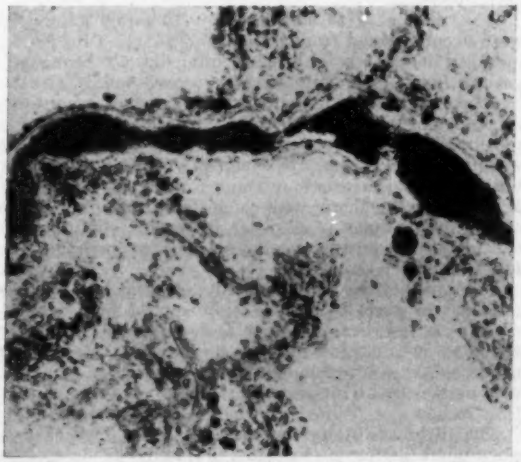

Fig. 4—Naples accident: body C. Pulmonary fat-embolism. (Sudan III and IV ×200.)

PATHOGENESIS

Lung injuries of a similar type have been described before, clinically or under experimental conditions, in at least three different situations: (1) in exposure to the effects of explosive blast; (2) as a result of very rapid ("explosive") decompression; and (3) as a result of certain severe forms of body impact and abrupt deceleration. Initially it seemed reasonable to suppose that any or all of these conditions might have prevailed at some time during the course of events associated with sudden structural failure at high altitude of a pressurised aircraft such as the Comet. It was therefore necessary to investigate each of these possibilities in some detail.

Blast Injury

The pathological and physiological effects of air blast from gunfire or detonation of high explosive have been observed in animals under experimental conditions (Hooker 1924, Zuckerman 1940, 1941).

Rabbits, mice, and other species killed outright showed no external injuries, but nearly all had blood or blood-stained froth in the upper respiratory passages. The outstanding lesions in all specimens killed or injured were alveolar disruption and massive pulmonary hæmorrhage, amounting in places to complete hepatisation. The injurious effects of blast diminished with increasing distance of the animals from the explosion. Hæmorrhages under the visceral pleura tended to assume a linear pattern of distribution, forming the so-called "rib markings." Animals exposed to underwater blast developed essentially the same pulmonary pathology (Williams 1942, Cameron et al. 1942). More recently Greaves et al. (1943) and Clemedson and Granström (1950) have shown that the subpleural hæmorrhagic bands do not correspond to the ribs but lie beneath the intercostal spaces.

Cases of death or injury in man due to air blast have been reported (Hadfield et al. 1940, O'Reilly and Gloyne 1941, Osborn 1941, Wilson and Tunbridge 1943). Lung damage termed "pulmonary concussion" was similar to that described by Zuckerman (1940). Hæmorrhagic "rib markings" were the rule in children just as in the experiments on animals; but in many adults such markings were not found. Elasticity of the chest wall may be a determining factor in this matter. Nearly all the fatalities, and most of those severely injured, had blood or bloodstained froth issuing from nose and mouth. In actual bomb incidents, however, severe pulmonary concussion was usually accompanied by additional evidence of the explosion, such as skin wounds caused by flying missiles (including bomb fragments) or burns from the fireball.

Very little is known for certain about the precise mechanism of pulmonary concussion, beyond the fact that it is an impact phenomenon resulting from impingement of the positive-pressure component of the blast wave on the body wall (Zuckerman 1940). Three ætiological factors have been suggested: (1) direct deformation of the lung tissues (Osborn 1941); (2) differential acceleration of the various structural elements of the thorax (Clemedson and Granström 1950); and (3) transmission of a shock wave through the tissues (Williams 1942). It may not be a question of which theory is correct but how much each factor contributes in any particular instance. Presumably the same factors operate whenever this type of lung injury, localised or diffuse, results from any form of non-penetrating blow to the chest wall. Penney and Bickley (1943), analysing unpublished numerical data on blast injury provided by Zuckerman, proposed that the lungs of any animal, including man, will be severely injured if the chest walls are flung inwards with

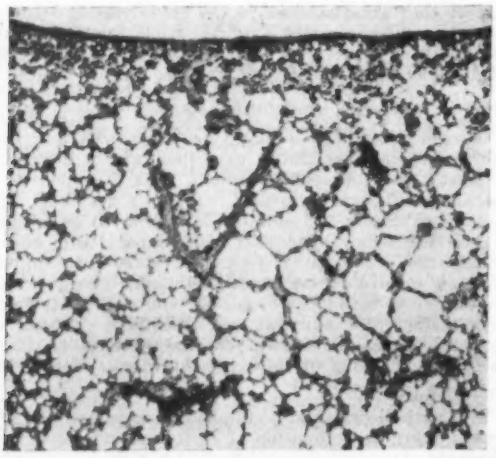

Fig. 5—Guineapig lung after explosive decompression from 0 to 35,000 ft. in 0·006 sec. (Hæmatoxylin and eosin. ×40.)

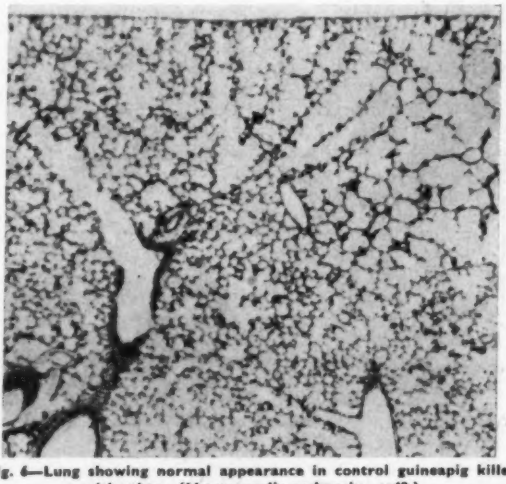

Fig. 6—Lung showing normal appearance in control guineapig killed with ether. (Hæmatoxylin and eosin. ×40.)

such acceleration that they acquire a velocity of 20 metres per sec. in half a millisecond or less.

Analysis of the necropsy findings in the Comet victims has led us to conclude that the pulmonary lesions were in all probability not caused by an explosion, the reasons being as follows:

(1) In none of the bodies recovered (including that of a child aged 10 years) did the subpleural hæmorrhages show a pattern of "rib markings."

(2) The lungs of all had much the same appearance, whereas in blast a significant variation in the degree of injury might be expected, people seated near the source being most severely affected.

(3) In no case was blood or froth present in the nose, mouth, or elsewhere in the upper respiratory passages.

(4) None of the bodies had skin lesions attributable to peppering with metallic fragments or other missiles.

(5) None had burns such as are caused by naked flame.

Incidentally, it may be noted that examination of the wreckage recovered from the sea bed off Elba led structural experts to conclude that there was no evidence of a bomb explosion or of any fire inside the cabin of the aircraft.

Explosive Decompression

The possible dangers of failure of a pressurised cabin at high altitude have been studied by physiologists since they were first consulted by aircraft designers about 20 years ago, when commercial high-altitude flight was first advocated. Initial fears were soon allayed by experiments (Heim 1938, Garsaux et al. 1939, Bergeret and Giordan 1939). Military applications of high-altitude flight led to an intensification of research, and experiments made on man in this country (Flying Personnel Research Committee 1942), the United States (Sweeney 1944, Hitchcock 1953), and in Germany (Benzinger 1950) showed that man can tolerate extremely rapid decompression without ill effect. After the war, when civil pressurised transport aircraft became a practical proposition, there was an urgent need for a clear exposition of the limits of human tolerance, so that an aircraft designer could estimate the risk to passengers from failure of a given area (e.g., a door, a window, or a hatch) at a known pressure differential. A formula, based on an interpretation of some experimental data, was proposed by Lovelace and Gagge (1946). Its validity has recently been challenged (Fryer 1953, Violette 1954) and an alternative means of assessment devised (Violette 1954).

Our knowledge of the pathological sequelæ of explosive decompression is based upon two sets of data: (1) the results of very numerous experiments on animals (Eggleton et al. 1945, Hitchcock 1953, Rotondo 1953); and (2) a little information on the injurious effects of explosive decompression on man. In animals it has proved very difficult to cause death or even symptoms, provided that prolonged anoxia has been avoided. For example, of 19 dogs decompressed from 10,000 to 50,000 ft. (a pressure differential of 8·4 lb. per sq. inch) in 0·012 sec. none developed any symptoms, although small areas of pulmonary hæmorrhage could be detected if the animals were sacrificed soon after the experiment (Edelmann et al. 1946). Of the lesions described by various workers, the most predominant has been scattered pulmonary hæmorrhages, often accompanied by areas of collapse. Emphysema has also been described, and "rib markings" were noted by Rotondo (1953). In none of these experiments was the injury comparable in severity with that found in the Comet victims, and some of it at least can be attributed to the methods of sacrifice used after recompression. Cole et al. (1953) report more extensive lesions, but in these experiments the picture was undoubtedly complicated by exposure to atmospheric pressures below that of the vapour pressure of water at body-temperature—i.e., when the tissue fluids "boil." The lung damage in these circumstances exceeded anything previously observed in experimental explosive decompression.

In experiments at Farnborough 10 adult guineapigs were decompressed from 0 to 35,000 ft. (11·2 lb. per sq. inch) in 0·006 sec. and then immediately brought to ground level. The guineapigs appeared mildly startled by the experience but showed no signs of respiratory distress and behaved quite normally during and after recompression. They were then killed with ether. Outwardly the lungs appeared congested in most specimens, but in 1 there were distinct hæmorrhagic "rib markings." Microscopically there was congestive atelectasis interspersed with areas of alveolar distension (fig. 5); but rupture of alveoli was uncommon, and hæmorrhages were few and widely scattered.

The lung lesions found in animals may be explained (at least in part) by the development of high pressure differences between the lungs and the atmosphere, with resulting overdistension of the thorax if the rate of environmental decompression is greater than the maximal rate at which the lungs can void their contents through the trachea.

The ill effects noted in man are few. Two cases of pneumomediastinum (Vavala 1954) and 1 of death from rupture of the lungs and massive air-embolism (Benson

1953) have occurred in the course of many hundreds of explosive decompressions under identical conditions during routine altitude tests in the United States. Benzinger described two incidents in Germany in which air-embolism is thought to have occurred during voluntary breath-holding in the course of explosive decompression. These phenomena are known complications of the decompression incurred during submarine escape if the glottis is closed (Polak and Adams 1932). Pneumomediastinum may similarly result from pulmonary alveolar rupture, allowing air to track interstitially via the hilum to the mediastinal tissues. It therefore appears that closure of the glottis might render serious or fatal an otherwise harmless decompression. No pulmonary lesions resembling those found in the animals have ever been observed in man after explosive decompression.

It is seen, then, that the widespread pulmonary lesions of the Comet victims might be attributable to explosive decompression if the conditions were such that the violence of the decompression exceeded the limits of human tolerance by a wide margin. On the basis of the formulæ derived by Lovelace and Gagge (1946) the possible borderline between "safety" and "uncertainty" would correspond, in the case of the Comet flying at 30,000 ft., to the instantaneous breaching of the cabin wall by removal of an area of 154 sq. ft. In such circumstances the decompression would take 0·062 sec. However, the more recent interpretation by Violette (1954) suggests that injury would result only if an area of more than 290 sq. ft. was lost, giving a decompression time of 0·032 sec. In fact, the expert examination of the wreckage of the Comet aircraft G-ALYP suggests most strongly that the primary failure involved the loss of a maximal area of 162 sq. ft., and that the splitting process which resulted in this failure took a finite time, which prolonged the decompression well beyond the calculated 0·059 sec. in the case of instantaneous disruption. In Sweeney's experiments decompression from 8000 to 35,000 ft. (7·5 lb. per sq. inch) in 0·09 sec. proved completely innocuous for 15 young adults; and 150 decompressions from 10,200 to 35,000 ft. (6·55 lb. per sq. inch) in 0·075 sec. caused no ill effects.

From such considerations it seems most unlikely that all the occupants of the aircraft should have sustained severe pulmonary injury from the primary effects of explosive decompression in the circumstances suggested by investigation of the wreckage. In addition it is noteworthy that there was no evidence in either accident of gross air-embolism or of mediastinal emphysema.

A second, and probably more relevant, result of explosive decompression is the expulsive effect of the air released when a large pressure-cabin fails. This is discussed more fully below.

Impact

Fatal falls from a great height to the ground are not uncommon; it is well known that in such cases there may be extensive internal injuries even when there are few external signs of trauma (Gosselin 1847, Moritz 1954). The destructive forces involved are presumably much the same as when the body is struck by a blunt moving object or by a blast wave; the only difference appears to be that here the effects are decelerative rather than accelerative. An important contribution on this subject was made by American workers investigating the rôle of deceleration in the genesis of injuries in military aircraft accidents. Hass (1944) referred to 21 cases in which at necropsy laceration, hæmorrhage, and traumatic emphysema in the lungs were found; there was also tearing of the heart and aorta, laceration of the liver, spleen, and ileum, and much free blood in the body cavities. Similar lesions were produced experimentally in animals by very abrupt deceleration (Rushmer et al. 1946, Rushmer and Hass 1946). The injuries were attributed partly to direct deformation and partly to differential deceleration of the tissues. To these should be added the possibility of shock-wave propagation.

Since the Comet G-ALYP is known to have broken up at high altitude, there is reason to suppose that the occupants of this machine were twice subjected to decelerative forces: inside the aircraft at the time of initial failure, and on impact with the sea. The altitude at which they left the fuselage is a matter for speculation, but a free fall of 2000 ft. is adequate for a human body to attain its terminal velocity of about 160 ft. per sec. It is important to know whether the internal injuries could have been caused, partly or entirely, by impact with the sea. The observations of Merkel (1926) and Ziemke (1928) on falls into water from heights of up to 150 ft. suggest that this is most probable, and that death may take place without signs of drowning. Very little is known about these matters, and it has been necessary to investigate them experimentally in guineapigs.

EXPERIMENTS ON GUINEAPIGS

Rationale of Experiments

The forces generated by impact of a rigid sphere with a water surface were studied by Richardson (1948); and from his results it has been possible to deduce the approximate incident velocity necessary, in any given species, to produce the inward movement of the chest wall specified by Penney and Bickley (1943) as critical for the production of blast injury in the lungs. Details of the mathematical method have been published separately (Stewart et al. 1955), and the calculations showed that the critical incident velocity for the mouse would be about 118 ft. per sec., for the guineapig 99 ft. per sec., and for man 94 ft. per sec.

Material and Methods

A vertical catapult was constructed for projecting anæsthetised or dead guineapigs at known velocity into a tank of water 5 ft. deep. The catapult consisted of a small metal carrier moving vertically on a tubular steel upright and powered by six strong rubber cords. The carrier could be raised to the desired height with a block and tackle and was fired by a manually operated release. The guineapig was lightly secured by strips of adhesive paper to the under surface of the carrier so that, when the latter was arrested at the lower limit of its excursion, the guineapig was projected, belly first, about $2^1/_2$ ft. through the air before hitting the water. The attitude on impact was checked by cinephotography, which revealed that the body usually rotated a little in the air. The incident velocity was measured in two ways: by high speed cinephotography, and by an electrical method using a slide wire connected to the carrier. These gave almost identical results.

The guineapigs were either male or female albinos weighing 300–400 g. 10 guineapigs were projected into the water at velocities between 66 and 117 ft. per sec. 6 were anæsthetised with ether, and the 4 others received an overdose of ether so that all respiratory movements had ceased 10 minutes before the experiment. Preliminary experiments showed that many anæsthetics, and commonly used methods of killing animals in the laboratory, may by themselves cause a remarkable degree of hæmorrhage or vascular congestion in guineapig lungs. Coal-gas was particularly injurious, sometimes even producing "rib markings." Several control specimens killed with ether, however, showed no evidence of pulmonary damage on naked-eye and microscopical examination (fig. 6).

In 3 of the anæsthetised guineapigs subcutaneous electrocardiographic electrodes were inserted into the right forelimb and both hindlimbs before they were fixed to the carrier. After the catapult was fired, each animal was left in the water for one to two minutes. Antero-posterior and lateral radiographs of the whole body were taken, and the guineapig was then dissected. Particular attention was paid to the condition of the thoracic and

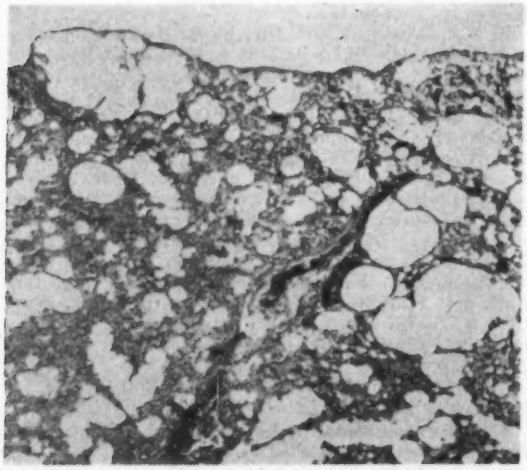

Fig. 7—Lung from anæsthetised guineapig projected into water at 117 ft. per sec., showing intrapulmonary hæmorrhage and traumatic emphysema. Compare with figs. 1 and 2. (Hæmatoxylin and eosin. ×40.)

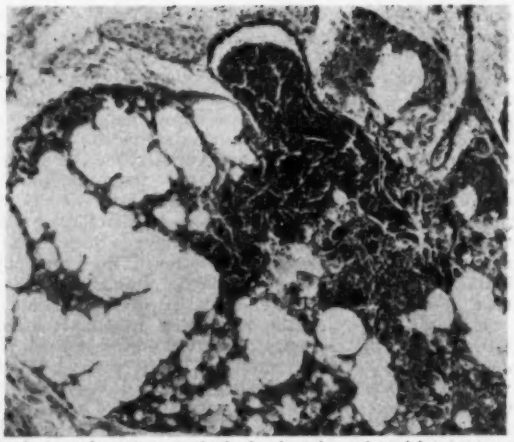

Fig. 8—Lung from an anæsthetised guineapig projected into water at 107 ft. per sec. Note large bronchial plug composed mainly of stripped epithelium. (Hæmatoxylin and eosin. ×68.)

abdominal contents. The trachea was first ligated, the chest was opened, and the heart and lungs were examined in situ. In some guineapigs these organs were removed, photographed, and fixed by submersion in Zenker-formalin. In others the hilum of the right lung was ligated, the left atrium opened, and the left lung then perfused through the pulmonary artery, at a pressure of 20 mm. Hg, with physiological saline solution followed by Zenker-formalin at 37°C; next, the thoracic contents were removed in toto and fixed by submersion in Zenker-formalin for a further twenty-four hours. In every case paraffin sections were prepared from each lobe of both lungs, and stained by the same techniques as used for the human necropsy material.

1 other guineapig was projected at a velocity of 100 ft. per sec. into a large pile of cotton-wool instead of into water; this was done as a control test to determine what effects, if any, might be attributable to the acceleration of the catapult.

Results

On recovery from the water all the guineapigs showed little external sign of injury, but all of the anæsthetised guineapigs were now dead. Most had some body flattening, 4 had bruises on the inner sides of the limbs or under the mandible, 1 had lost most of the hair from a large area on the front of the thorax, and 4 had palpable fractures of the right tibia.

Internal injuries were severe. The lungs of all 4 guineapigs projected into water at velocities of 104 ft. per sec. or more were extensively damaged, much as in cases of severe blast injury. Subpleural hæmorrhages were found on all surfaces of both lungs; in many areas they were confluent and in places (particularly on the posterior surfaces) they formed a distinct pattern of "rib markings." There were patches of subpleural emphysema and occasional small tears on the costal and diaphragmatic surfaces. Microscopically there was generalised pulmonary disruption with massive hæmorrhage (fig. 7); the traumatic emphysema amounted in places to cavitation. Intervening small areas of collapsed or of relatively normal lung tissue were present. Many bronchi were partially or completely occluded by plugs consisting of material staining with periodic acid-Schiff reagent and shreds of bronchial epithelium which seemed to have been stripped from the bronchial wall with disruption of many individual cells; occasionally it appeared as if the stripped bronchial epithelium had moved distally, blocking alveolar ducts and even alveoli (fig. 8). Some large pulmonary blood-vessels and lymphatics were torn across, whereas others were abnormally congested. In all the guineapigs the upper lobes tended to be less severely affected than the middle and lower lobes.

Similar but localised pulmonary lesions were found in guineapigs projected into the water at velocities of 75–101 ft. per sec. Two guineapigs projected at 66 and 73 ft. per sec. showed only patchy subpleural ecchymoses and congestion of the pulmonary vessels. The control guineapig projected into cotton-wool developed a single subpleural ecchymosis on the anterior margin of the left upper lobe. The lungs were also congested but otherwise intact; and the only other lesion found was a small hæmorrhage into the perinephric fat.

Throughout these experiments no difference in lung pathology could be seen between the anæsthetised and dead guineapigs; in none of the former was there any evidence of death by drowning.

Necropsy findings other than in the lungs can be summarised briefly. Most of the guineapigs had a few small hæmorrhages into the muscles of the chest wall. Hæmothorax was present in 6 cases, hæmopericardium in 3. Cardiac distension, particularly of the right ventricle, was obvious in 4 guineapigs, and in 2 there was a small tear in the wall of the right atrium close to the point of entry of the inferior vena cava. In the abdomen there was free blood in the peritoneal cavity in 10 guineapigs, ruptures of the stomach or intestinal tract in 7, laceration of the liver in 7, a splenic tear in 1, and multiple mesenteric or retroperitoneal hæmorrhages in 7. The diaphragm remained intact. Skeletal injuries seen in the radiographs were not extensive; they were a constant finding only in guineapigs projected into water at the highest velocities. Minor fractures of the skull were found only twice; spinal fracture-dislocations appeared in 3 cases, costovertebral dislocations in 2, and various limb fractures in 5.

Owing to technical difficulties a continuous electrocardiographic record was obtained in only 1 guineapig, abnormal cardiac activity being recorded after impact with the water at a velocity of 95 ft. per sec. There was complete atrioventricular dissociation; but ventricular activity persisted for some minutes in an altered but regular form, evidently controlled from a ventricular ectopic focus.

Conclusions

(1) The experiments suggest that severe internal injuries may be expected as a result of impact with a

water surface. The pulmonary and intra-abdominal lesions are essentially the same as those found in the Comet victims. The latter did not have "rib markings," but this is probably acceptable as a species difference. Such markings are readily produced in guineapigs, not only by blast and impact but also by explosive decompression and even coal-gas poisoning, whereas in man many cases of severe lung damage from air blast and from body impact have not shown this phenomenon. Nor is it a feature of coal-gas poisoning in man.

(2) The degree of lung injury from water impact is related to the incident velocity, the critical velocity for generalised injury in the guineapig being about 104 ft. per sec. This is close to the predicted value, but owing to the approximate nature of the calculations this must be regarded as largely fortuitous.

(3) Living anæsthetised guineapigs may be killed by the impact and show no evidence of death by drowning.

Skin Lesions

ELBA ACCIDENT

In 14 of the 15 bodies recovered from the sea at Elba there was a similar type of skin damage. The affected areas had the following features:

(1) They were red, and their peripheral margins were distinct but irregular in outline.

(2) In some bodies they were traversed by parallel-sided bands of apparently undamaged skin.

(3) In most cases the affected parts were beneath the clothing found on the cadaver when removed from the sea.

(4) There was no evidence of scorching or singeing of hair or epidermis, but in places there was some exfoliation.

(5) None of the clothing was burnt or decomposed in any way.

(6) Some of the areas of skin damage corresponded closely to yellowish stains on the adjacent and overlying garments.

13 bodies showed this type of injury on the back and/or buttocks; 3 of these bore further lesions: one on the calf, a second on the thigh and temple, and the third on a small area under the chin. Of the remaining 2 bodies 1, that of a corpulent adult male, had a large area of altered skin on the front of the trunk only, and the last body was completely unmarked in this respect.

Histologically these lesions showed no signs of vital reaction. The epidermis was in some areas intact, in others separating or absent. Epidermal cells usually showed a vacuolar change. An accumulation of brown pigment-like granular material in the basal cells and occasionally in malpighian and horny layers was noted in 4 of the 5 specimens from pale-skinned European bodies. The dermis showed well-preserved glandular and hair-follicle elements but severe degenerative, often coagulative, change in the collagen (Fornari 1954).

Fig. 9—Naples accident: body C. Pattern of skin darkening on front of thighs, with "shadowing" of garments.

NAPLES ACCIDENT

3 of the bodies recovered had obvious skin changes quite different from those described in the victims of the previous crash. In each case the lesions appeared as a brown or smoky coloration in exposed parts of the body, with sharply defined margins corresponding to the edges of garments. In 1 body the darkened areas were the back and front of the trunk and thighs, with an encircling pale band corresponding to the level of the waistband of the skirt; the darkening was sharply limited above at a level corresponding to the lower edge of a brassiere, while the lower edge was not well defined. In a second case (adult male) the back showed a clear T-shaped pale band underlying the waist and perineal straps of a patent suspensory garment. The third body showed very clearly intense darkening of the areas between stocking tops and corset, with pale bands corresponding to the outlines of the suspenders (fig. 9). There was in this case less intense darkening of areas underlying the main parts of the stockings, and sparing of the skin under the reinforced band at the upper end. This "shadowing" of garments was less marked on the back than the front of the thighs. The 2 remaining bodies showed a slight darkening of the skin of the legs, not clearly delineated above but cut off sharply at the level of the shoes in one case, and the level of short socks in the other. The clothes bore no signs of fire or chemical staining. The affected areas of the skin were not those one would normally expect to find "tanned" by sun-bathing during life.

Histologically the skin was normal. In view of the long interval between death and necropsy the preservation was remarkably good. Pigment granules were visible in the normal situation in skin from both pale and dark areas of the bodies, with no visible difference in quality, quantity, or distribution.

CAUSATION

The first consideration appears to be whether the two types of lesions (called for convenience "burns" and "darkening" in the Elba and Naples accidents respectively) can be attributed to the same cause or causes. In studying this matter the following conclusions were reached:

(1) Neither type of lesion appeared to be familiar to forensic pathologists, and no immediate cause could be assigned to either when first seen.

(2) In both accidents most of the bodies were affected, but the types of skin change were quite distinct—i.e., "burns" only in Elba bodies, "darkening" only in the Naples bodies.

(3) There was a fundamental difference in distribution of lesions, "burns" affecting predominantly clothed areas, and "darkening" involving exposed skin only.

(4) There was histological evidence of tissue destruction in the "burns" only.

(5) In neither case was there any evidence of exposure to flame or searing temperatures.

In view of these facts it was felt that separate causes are possible, and indeed probable, for the different types of lesion. Was there any factor, present in one accident and absent in the other, which might give a clue to the ætiology of the injuries? The only obvious difference was that the length of time that the bodies were in the sea differed greatly: four hours at Elba, and twenty-two hours at Naples.

Ætiology of "Burns"

In the course of discussions with Dr. Teare the following possible causes were considered:

(1) *Contact with hot metallic surfaces not hot enough or acting long enough to cause singeing.*—This is improbable because it would imply that all but 2 of the bodies lay oriented back-

down to the surface, which was uniformly heated to a subsingeing temperature; or that contact was limited to a short time in all the cases. It also seems unlikely that in only 1 instance was an unclothed area burnt in spite of such parts being exposed more directly to any heat source.

(2) *Contact with hot liquid or vapour in the aircraft.*—The location of the lesions would again imply similar orientation of 13 of the 15 victims. Of the possible liquids, engine-oil, tea, and coffee have been excluded by chemical examination of the clothing. Hydraulic fluid, though not definitely ruled out, is a most unlikely agent when its volume, temperature, area of spread, and access to the passenger cabin are considered. Once more the sparing of exposed parts is unexplained by this theory.

(3) *Abrasion on impact.*—This is considered to be ruled out on the basis of absence in the Naples victims, the distribution of the lesions, and the macroscopical and microscopical appearances.

(4) *Exposure to high-intensity flash from an aircraft fire during free fall of the bodies.*—This is unlikely, and is incompatible with the location of injury in covered areas.

(5) *Fall through flame from burning fuel in or near the aircraft.*—This cannot be reconciled with the absence of scorching or charring of clothes and skin.

(6) *Chemical burning.*—Battery fluid can be excluded on the grounds of lack of access and failure of chemical tests on clothing. Two highly suspect substances known to be present are kerosene fuel (paraffin) and methyl bromide (used in fire extinguishers in engine and equipment bays of the aircraft). The former was present in large quantities, and is known to be a skin irritant under some circumstances; moreover, the clothing on the bodies smelt strongly of kerosene. However, exposure of skin to kerosene and sea-water-soaked clothing produces no lesions, at least during the relevant period. Methyl bromide can certainly burn living skin (von Oettingen 1946), and, being highly volatile, is difficult to detect in clothing. However, in experiments made at the R.A.F Institute of Pathology and Tropical Medicine only 1 of several freshly killed guineapigs showed any reaction to being clothed over the shaved abdomen, sprayed with kerosene and methyl bromide, and then floated in sea-water. The solitary finding was slight congestion of the dermal capillaries, with occasional extravasated red cells—quite unlike the human material from Elba.

Fig. 10—Guineapig skin: normal appearance. (Hæmatoxylin and eosin. ×28.)

(7) *Contact with a surface layer of sea-water heated by burning kerosene.*—Experiments suggest that this is the most probable explanation of these "burns." A film of kerosene burning on the surface of a large expanse of water produces temperatures of 100°C at surface level, 70–100°C at a depth of $^1/_4$ inch, 30–50°C at a depth of $^1/_2$ inch, and no change (18°C) at or below 1 inch from the surface (Royal Aircraft Establishment 1954). In experiments at Farnborough, recently killed guineapigs were "clothed" with bands of various types of material over depilated abdominal areas and allowed to float on the surface of a water tank 35 ft. in diameter. Kerosene was poured on to the surface and ignited. In spite of all the bodies having been enveloped in an unapproachable conflagration (air temperatures of 500°C $^1/_2$ inch above the water surface) the only sign of their having been exposed to fire was scorching of the distal parts of the limbs and ears in 3 of 6 animals. It was apparent that these relatively rigid members projected above the water in a way unlikely to be paralleled by any portion of the human anatomy. None of the clothing was burned. Underneath the fabric, which was in most cases stained in a similar way to the garments seen at Elba, pinkish areas of indurated skin could be seen and palpated. These areas, on one or both flanks, corresponded to the uppermost portions of the floating guineapig in each case. Comparison of histological preparations of the skin from affected and control areas showed relatively little change of the epidermis but very pronounced swelling and coagulative necrosis of the dermal collagen (figs. 10 and 11). Glandular structures and hair follicles were still recognisable.

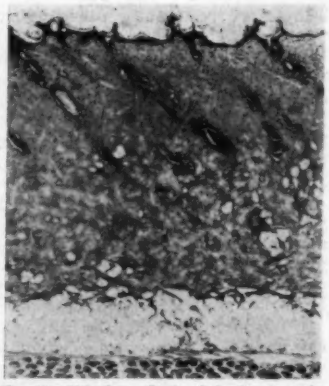

Fig. 11—Skin from flank of dead guineapig floated in water covered by burning kerosene, showing dermal thickening and coagulative necrosis. (Hæmatoxylin and eosin. ×28.)

It appears that clothed bodies, floating in water where a kerosene film is burning, may be scalded by the heated surface layer of water about $^1/_2$ inch in depth, without singeing or charring of the clothing or hair, provided that the garments are wet and that no part projects above the surface. Little is known of the orientation of a floating freshly dead cadaver killed by means other than drowning. It is most probable that the position is face down, with the limbs and head dependent. It was recorded by those who recovered the bodies at Elba and Naples that in each case all but one of the bodies was floating back uppermost. In such circumstances the scalded areas in a person floating in a kerosene fire would correspond closely to those areas of the back predominantly affected in the Elba victims. The unidentified yellow stains on the clothing are, of course, also accounted for by this theory; but their exact nature remains obscure.

Ætiology of "Darkening"

This type of skin marking could be ascribed to one or more of three fundamental types of change: application of an exogenous coloured material, formation of an intradermal or intra-epidermal coloured substance from degradation of structural elements, or intensification of the normal pigment of the skin.

An exogenous coloured material was excluded by the failure of various solvents to remove the colouring, and the absence, in unstained frozen sections, of any apparent surface deposit of coloured matter. In stained and unstained sections there was no evidence of structural or colour abnormalities other than slight post-mortem change which was the same in dark and pale areas. Darkening of pre-existing melanin in human skin under certain conditions, which could occur in life or after death, was described by Meirowsky (1909). This and subsequent work (Lignac 1923, Miescher and Minder 1939, Blum 1948) has shown that pigment can be darkened in dead skin by exposure to sunlight or to long-wave ultraviolet rays over the 3000–4200 Å range, and by maintaining pieces of dead skin at a temperature of 56°C for one to three days.

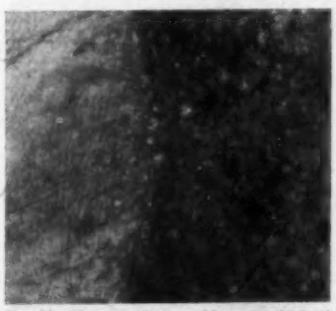

Fig. 12—Pigment darkened in recently dead skin of human thigh after six hours' exposure to emission of carbon-arc. Left half of specimen was shielded from light. (×2 approx.)

In experiments made at the National Physical

Laboratory, with the kind coöperation of Mr. J. S. Preston and others in the Radiant Energy Section, pieces of human skin which had been dead for about twelve hours were exposed to a light source (a cored carbon-arc) with an emission similar in long-wave ultraviolet content and intensity to summer sunshine. Part of each piece of skin was shielded with aluminium foil. Well-defined darkening of the pigment was produced after two and a half hours' exposure, and was little changed by prolongation to six hours (fig. 12).

It is difficult to imagine circumstances in the accident which would give rise to a short-duration "flash" emission of sufficient energy to cause the skin changes seen in the Naples bodies. It is known that they floated in the sea for about twenty-two hours, including the greater part of a clear sunny day, and in all probability the skin markings were due to post-mortem darkening of pigment in unclothed areas as a result of ultraviolet irradiation. The sites of maximal intensity of pigmentation were as might be expected from the attitude of the bodies when found.

Conclusions

Reconstruction of the events from medical evidence alone must, of necessity, be largely a question of relative probabilities; but the condition of the bodies recovered from the sea can be explained most satisfactorily on the basis that the injuries were inflicted in three distinct phases: in the aircraft, on impact with the sea, and while the bodies were floating in the water.

Head injuries, including multiple fractures of the vault and base of the skull, were an outstanding feature. Extravasations of blood showed that most of these occurred in life. The observations of Merkel (1926) and Ziemke (1928) on deaths from jumping into water show that head injuries of this type do not occur regularly in such cases; and our experimental findings are in full agreement with this. We conclude that the head injuries, together with certain abrasions and at least some fractures of the thoracic cage, were acquired in the aircraft, apparently as the result of an extremely violent upward and forward displacement of the seated occupants at the moment of the initial failure. Safety-belts would not have been fastened half an hour after take-off; and these injuries could be expected to result from violent impact with the inside of the aircraft and its furnishings. They were alone sufficient to cause death, and were presumably the source of fat-embolism in those cases in which it was found. This violent movement may have contributed to the internal injuries but is not thought to have been the major cause.

Initially there was much speculation about the origin of the displacement forces. Calculations by aerodynamicists showed sudden deviation from the line of flight, due to malfunction or misuse of controls, unlikely to be sufficiently violent to cause such numerous skull fractures. The latent energy in a pressurised cabin of large volume has been calculated as being equivalent to that contained in about 100 lb. of high explosive (Walker 1950), and the hazard to occupants of displacement by the rush of escaping air during sudden depressurisation has long been appreciated (Sweeney 1944, Fulton 1948). The dramatic effects of such failure have been illustrated by model cabin tests with anthropomorphic dummies at the Royal Aircraft Establishment. We conclude that the most probable cause of the upward and forward motion imparted to the occupants of the aircraft was a sudden cabin failure. In fact, reconstruction of the Elba wreckage demonstrated beyond doubt that an initial structural failure of this kind did take place; and extensive examination and testing of Comet aircraft have supported the belief already expressed that the Naples accident followed a similar pattern. There is no definite evidence to show whether or not the lungs were damaged by the explosive decompression, but for reasons already given this is considered to be unlikely.

As the aircraft broke apart, all or most of the passengers were ejected, presumably at different altitudes, and fell into the sea. All the available evidence indicates that forces generated by impact with a water surface after such a fall must cause grave injury to internal organs. The nature of the internal injuries in the bodies recovered, including the pulmonary lesions, is consistent with their having been caused for the most part in this way. In the circumstances any pre-existing visceral damage due to explosive decompression or to impact within the aircraft could not be identified. Other injuries probably received at the same time include fractures of the limb bones and spine, and further damage to the thoracic cage. Experimental dropping of full-scale clothed dummies has confirmed that impact with the sea, rather than free fall through the air, was also responsible for the extensive loss of clothing (Royal Aircraft Establishment 1954). It is just conceivable that a few passengers remained within a segment of the fuselage until it hit the sea. This is unlikely to have afforded much protection, but might possibly explain why some of the bodies, all from rearmost seats, had retained most of their clothing.

Finally, while floating on the sea, 14 of the Elba bodies were subjected to post-mortem scalding of the skin. It is improbable that they fell into an existing kerosene fire, because there was no singeing or burning of their clothing or hair; more likely the fire started after they had fallen into an area covered by a kerosene film. The bodies from Naples showed no scalds but instead a pattern of post-mortem darkening of the pigment (the Meirowsky phenomenon) as the result of exposure to the bright sunshine of April 9.

We are greatly indebted to Prof. A. Fornari, of the Institute of Forensic Medicine in the University of Pisa, and to Dr. Donald Teare for allowing us access to the necropsy material, and for their advice and coöperation throughout the investigation. We wish to acknowledge also the coöperation of the director and staff of the Royal Aircraft Establishment; and help in the experiments from colleagues at the Institute of Aviation Medicine. We are grateful to Sir William Penney for allowing us to quote from unpublished work, and to the Commissioner of Metropolitan Police for the photograph reproduced as fig. 9. Finally, we are indebted to the Director-General, R.A.F. Medical Services, for permission to publish.

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COMPLICATIONS OF CHLORPROMAZINE THERAPY IN 800 MENTAL-HOSPITAL PATIENTS

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CHLORPROMAZINE has been increasingly used in both psychiatry and anæsthetics since 1951. The early investigations of Courvoisier et al. (1953) into its pharmacological effects on animals suggested that it was relatively non-toxic, but subsequent trials on man have not confirmed this, and Burn (1954) suggests that it is toxic to animals. Complications have been reported which, though not perhaps justifying all the precautions advocated by the earlier workers, suggest that great care should be taken in administering chlorpromazine.

The complications can be divided into side-effects and toxic reactions. The side-effects are usually due to the pharmacological action of chlorpromazine on the autonomic nervous system and are therefore necessary concomitants of the treatment, whereas the toxic reactions are observed in relatively few patients and are due to idiosyncrasy. The distinction is not absolute, there being some overlap between the two types of complication.

Side-effects Previously Reported

Cardiovascular system.—The most important side-effects concern the cardiovascular system. Tachycardia and pallor are almost unavoidable, at least in the early stages of treatment, and are sometimes associated with a fall in blood-pressure which may give rise to vertigo, weakness, and syncope. For this reason the earlier workers advocated rest in bed in the initial stages of treatment (Delay and Deniker 1952, Sigwald and Bouttier 1953a, Anton-Stephens 1954), but this is now considered unnecessary (Garmany et al. 1954, Lomas 1955).

Gastro-intestinal tract.—Gastro-intestinal disturbances are common; dryness of the mouth is mentioned in almost all reports, and constipation, diarrhœa, nausea, and vomiting are common. Nausea and vomiting are perhaps surprising in view of the proved anti-emetic action of chlorpromazine (Friend and Cummins 1953, Moyer et al. 1954a). Lehmann and Hanrahan (1954) report an increase in appetite and a gain in weight; these changes Elkes and Elkes (1954) correlate with clinical improvement.

Respiration.—Courvoisier et al. (1953) found that small doses stimulated, and larger doses depressed, respiration in rabbits. This difference of action in different dosages may explain the conflicting reports on the effects of chlorpromazine on respiration in man: Lehmann and Hanrahan (1954) found no change, Staehelin and Kielholz (1953) depression, and Bensoussan and Klein (1953) severe dyspnœa.

Micturition.—Lehmann and Hanrahan (1954) found an increased frequency of *micturition* but no other abnormality. This is confirmed by Moyer et al. (1954b).

Central nervous system.—A parkinsonian-like syndrome is reported by Lehmann and Hanrahan (1954), Azima and Ogle (1954), and Anton-Stephens (1954), who, probably correctly, attribute it to overdosage. Anton-Stephens (1954) and Winkelman (1954) report an increased tendency to dream.

Local irritation.—Intramuscular chlorpromazine produces local irritation at the site of the injection; this may cause considerable discomfort (Anton-Stephens 1954, Winkelman 1954, Charatan 1954), which can be minimised by diluting the injection (Deschamps 1952, Staehelin and Kielholz 1953, Arnold et al. 1953).

There is no change in the blood-sugar level (Staehelin and Kielholz 1953, Lancaster and Jones 1954), electrocardiogram (Friend and Cummins 1953, Moyer et al. 1954b), or electro-encephalogram (Terzian 1952, Flügel 1953).

Toxic Reactions Previously Reported

Acute toxic reactions have been singularly rare, but Deniker (cited by Winkelman 1954) had a patient who attempted suicide by taking 750 mg. of chlorpromazine and lapsed into a coma but recovered uneventfully within a few days. Charatan (1954) and Lomas (1955) recorded 1 and 9 deaths respectively in their series, but in none of these cases could chlorpromazine be implicated with any conviction. In 2 patients, however, both of whom had liver disease, chlorpromazine was considered to be at least a contributory cause of death (Boardman 1954, Deschamps 1952).

Hepatitis

The most serious complication is toxic hepatitis. Garmany et al. (1954) reported abnormal liver-function tests, and bile salts in the urine, but no manifest jaundice in 3 of 29 cases. Charatan (1954) had 1 case in 42, and Winkelman (1954) 3 in 142 (in 1 of these liver biopsy showed chronic liver damage). Lehmann and Hanrahan (1954) treated frank jaundice in 3 of their 71 cases but reported slightly abnormal liver-function tests in 50%.

On the other hand, Elkes and Elkes (1954) had 1 case of jaundice in 27 but found no abnormality in liver-function tests done at fortnightly intervals in the 26 other cases; and Moyer et al. (1954b) found hepatic function normal in 25 cases. Azima and Ogle (1954) report 8 cases in 100, but there was an outbreak of mild infective hepatitis at the time. Eagles (1955) reports 3 cases in 18—the highest incidence yet recorded. Both Garmany et al. (1954) and Elkes and Elkes (1954) continued treatment with chlorpromazine after an interval and observed no untoward effects.

Blood Picture

Rizzo and Russo (1953), in carefully conducted investigations on 15 patients, found after a single injection of chlorpromazine an almost constant slight decrease in the number of red cells and in the amount of hæmoglobin, with leucopenia, lymphocytosis, neutropenia, and eosiniphilia. This change was observed three hours after the injection, but the blood tended to return to normal in twelve hours. Similarly the erythrocyte-sedimentation rate (E.S.R.) rose three hours after the injection and tended to return to normal in twelve hours. This difference in the findings after three and after twelve hours may possibly explain the different results of other workers.

Friend and Cummins (1953), Lehmann and Hanrahan (1954), and Charatan (1954) found no change in the blood picture. Elkes and Elkes (1954), who did full blood-counts fortnightly, found polychromatic cells with basophil stippling in 1 case and neutropenia in 1 other. Staehelin and Kielholz (1953) and Delay et al. (1952) agreed with Rizzo and Russo (1953) in finding an initial neutropenia returning rapidly to normal, but found no abnormality in the red-cell count. Anton-Stephens (1954), on the other hand, found a leucopenia in half his cases and a raised E.S.R. in almost all. Lomas (1954) reports 1 case of agranulocytosis, and F. J. Ayd (personal communication) mentions 8 others in the United States. Of these, only 1 has so far been published (Boleman 1955); of the unpublished cases 1 proved fatal but all the others were cured with corticotrophin.

FLIGHT-LIEUT. ARMSTRONG AND OTHERS: REFERENCES—*continued*

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Pyrexia in the first few days' treatment has been noticed by most workers (Staehelin and Kielholz 1953, Garmany et al. 1954, Lehmann and Hanrahan 1954). Sigwald and Bouttier (1953b), and Charatan (1954) attribute it to local inflammation at the site of injection.

Skin eruptions, either urticarial or maculopapular, are reported by Broussolle and Hamoneau (1953), Azima and Ogle (1954), Winkelman (1954), and Lehmann and Hanrahan (1954), the last-named in 13% of their cases.

Epileptic fits.—Anton-Stephens (1954) mentions that 1 post-leucotomy patient had epileptic fits but attaches no significance to this finding. Lehmann and Hanrahan (1954) note that 1 patient, who had been given 2 ml. of nikethamide after chlorpromazine, developed status epilepticus.

Present Survey

Our report is based on 800 patients (260 male and 540 female) treated with chlorpromazine in Springfield Hospital between November, 1953, and the end of 1954. The patients were not questioned about any untoward effects; hence any complications noted were either a result of spontaneous complaint by the patients or observed by the nurses and doctors.

Toxic effects were all recorded on a pro forma with a note of the dosage, total amount of chlorpromazine administered at the time of the reaction, duration of treatment, and any possible alternative ætiology to chlorpromazine.

Though all types of mental cases were treated, the great majority were acute or chronic psychoses. The dosage varied considerably from patient to patient, but the most commonly adopted plan was to start with 150 mg. daily and to increase rapidly to 300 mg. daily. The less seriously disturbed patients received smaller doses, and a few patients had their dosage increased to 800 mg. daily. The duration of treatment varied from a few weeks to several months. The great majority of patients received the chlorpromazine by mouth and were treated ambulant from the start. A minority underwent electro-convulsion therapy concurrently, and most patients were receiving barbiturate sedation. No other form of therapy could account for the toxic reactions.

SIDE-EFFECTS

Cardiovascular System

The tachycardia noted by most previous workers was present also in this series and, when looked for specifically, was found in almost all patients in the initial stages of treatment. Only extremely rarely was it associated with palpitations or did it give rise to any spontaneous complaint from the patient. Pallor was less common.

Minor hypotensive symptoms were complained of by some patients in the early stages of treatment, but syncopal attacks were extremely rare. With 1 exception, the few which did occur were all in elderly or arterio-sclerotic patients. For this reason it was considered unnecessary to treat patients in bed unless their mental condition necessitated it, with the exception of the elderly and the arteriosclerotic.

Gastro-intestinal tract.—Of gastro-intestinal complaints dryness of the mouth and constipation were far the most common. Nausea, vomiting, and diarrhœa occurred too rarely for chlorpromazine to be implicated. A pronounced increase in appetite and weight were noted, particularly in patients given chlorpromazine for a long time. One patient, who had not previously shown pronounced fluctuations in weight, gained 5 st. in as many months.

Respiration.—No respiratory anomalies were noted.

Micturition.—Frequency of micturition was observed. Occasional incontinence of urine and more rarely still of fæces occurred. Incontinence seems to be due to over-dosage because it rapidly disappears if the dosage is reduced.

Central nervous system.—The parkinsonian-like syndrome was also occasionally noted and similarly responded to a reduction in dosage.

Local irritation at the site of injection occurred but was not of great importance in this series because the great majority of patients received the chlorpromazine by mouth.

Both subjective complaints and observed disturbances were much less common in disturbed psychotic patients than in others, and the more chronic the psychosis the less was the incidence of side-effects. The only exception to this was the gain in weight, which took place in all types of patient if they were treated with chlorpromazine for a long time. The predominance of psychotic patients in this series may explain the altered emphasis on the various side-effects from that of other investigators.

TOXIC REACTIONS

The total number of toxic reactions recorded in the 800 patients was 59 (7·4%). Of these 48 (8·9%) occurred among the women and only 11 (4·2%) among the men. This difference varies in the different toxic reactions (see below).

Jaundice

All patients in whom jaundice arose during chlorpromazine therapy are included; no cases arose after completion of therapy. Unfortunately the study is clouded by the coincidental appearance of infective hepatitis in patients not receiving chlorpromazine. The two conditions were clinically and biochemically indistinguishable, but the incidence was significantly higher in the chlorpromazine population, only 3 cases occurring in the rest of the hospital population of over 2000 patients.

There were 11 cases of chlorpromazine jaundice (1·4%), 4 male (1·5%), and 7 female (1·3%). No age-group was immune. At the onset chlorpromazine had been administered for from sixteen to thirty-three days (mean twenty-two). The daily dosage at that time and the total quantity administered varied widely and were not significant. All the patients received the chlorpromazine by mouth, but 5 had started with intramuscular injections for a few days. The appearance of jaundice was regarded as an absolute contra-indication to the further use of chlorpromazine. The jaundice lasted from one to twenty-six weeks; but, if the 2 most severe cases (in which the jaundice lasted thirteen and twenty-six weeks) are excluded, the mean duration was two weeks.

In 7 instances icterus was the presenting symptom, associated in 1 case with pyrexia and gastro-intestinal disturbance, and preceded by four days in 1 other case by ephemeral asymptomatic pyrexia. It is possible that ephemeral pyrexia had been missed in other cases. Prodromal fever and malaise lasting one or two days ushered in 3 further cases, 1 of which had already shown a morbilliform rash for a week. The remaining case showed gastro-intestinal symptoms, gradually remitting, nine days before jaundice on the twenty-second day. 6 of the patients presenting with icterus felt relatively well at onset, including the 1 fatal case. Anorexia was severe in 2 other cases.

During the jaundice itching was common; the liver was somewhat enlarged and slightly tender; the stools varied in colour from normal to off-white; and the urine contained bile salts and pigments.

The 3 mildest cases were not studied biochemically. In the 8 others thymol turbidity, colloidal gold, and Takata-Ara reactions and plasma-protein estimations showed no abnormality. The plasma-alkaline phosphatase and serum-bilirubin levels and the bromsulphalein clearance (when tested) showed consistent changes which reflected the clinical state. The alkaline phosphatase showed peak values of 15–70 King-Armstrong units per 100 ml. (normal 2–12), and the serum-bilirubin 3–23 mg.

per 100 ml. (normal 0·5). The "direct" component of the serum-bilirubin was invariably 2–2½ times as great as the "indirect."

9 cases ran an uneventful course to recovery. Of the 2 other patients 1, a chronic encephalitic, recovered after a stormy twenty-six weeks but five months after clinical recovery still has an alkaline-phosphatase level of 45 King-Armstrong units and bromsulphalein clearance of 83% only (normal 95%); the other patient, who had chronic rheumatic heart-disease, died after thirteen weeks' remittent illness (Boardman 1954).

Clinically and biochemically the jaundice is of obstructive type, but the liver in the fatal case showed central necrosis and biliary stasis, severe lobular atrophy, relative preservation of portal areas, and absence of exudate, which were interpreted as "subacute toxic hepatitis of blood-borne type." The ante-mortem passive congestion of the liver did, of course, contribute to a significant degree to the central necrosis.

Blood Picture

Routine blood-counts were done weekly on 25 patients throughout the course of chlorpromazine. No consistent general depression or stimulation of hæmopoietic tissue was found. The case of agranulocytosis has already been described (Lomas 1954), where the white-cell count decreased to 400 per c.mm. but rapidly increased to 5300 per c.mm. in ten days after the chlorpromazine was withheld. In 4 cases there was a moderate leucocytosis increasing to a maximum in the third or fourth week of treatment, followed by a gradual decrease. One case with a leucopenia of 2000 white cells per c.mm. was noted in the fourth week, but this soon cleared when chlorpromazine was withheld. In another case a leucopenia of 3000 white cells per c.mm. was noted in the fifth week, but subsequent counts were within normal limits. This patient had been diagnosed two years previously as having aplastic anæmia but had recovered, and the leucopenia may have been due to abnormally sensitive bone-marrow. A microcytic hypochromic anæmia had been noted, with a decrease in the number of red cells from 4,680,000 to 3,000,000 per c.mm. by the fifth week.

In more than half the cases the E.S.R. rose to a maximum by the fourth week and then fell gradually, with a secondary rise in the seventh or eighth week in a minority. There was no appreciable change in the remainder.

Blood studies in 6 of the skin reactions showed definite eosinophilia (13% and 7%) in 2. These cases also showed mild leucocytosis of 11,450 and 13,600 per c.mm., the eosinophil-counts being 1488 and 952 per c.mm. respectively. Such responses, in conjunction with the clinical pictures, suggest either a hypersensitivity reaction or depression of the adrenocortical hormones.

Studies of the pyrexial cases showed moderate neutrophil leucocytosis in 2 patients.

Skin Reactions and Œdema

These two reactions are discussed together because they so often occurred in association. 22 cases (2·8%) were noted, 19 (3·5%) among the women and only 3 (1·2%) in the men. 10 cases showed skin reaction and œdema mainly of the face but sometimes of the extremities as well. 8 showed skin reactions only, and 4 œdema alone. 3 cases had a slightly raised temperature, but the rest were apyrexial.

The skin reactions were of two distinct types. The first was an erythema confined to the exposed parts of the body and noted in 8 cases. It occurred at any stage in treatment and on various dosages, but 6 of the 8 cases developed in August and the 2 others in April and June. This reaction was regarded as due to photosensitivity, but similar reactions among the rest of the hospital patients, owing to the deficiency of sunlight last summer, were extremely rare.

The second reaction, observed in 14 patients, was a morbilliform eruption over the entire body. It came on between the fourteenth and thirty-fifth days of treatment except in 2 cases, and most of the cases arose about the beginning of the fourth week. Most of the patients were receiving 300 mg. daily at the time, which would be the expected daily dosage at this stage of treatment. The total dosage received varied considerably.

The rash cleared up uneventfully in about a week, whether treatment with chlorpromazine was maintained or not, and did not recur when treatment was resumed. Generally, when there was no œdema, treatment was continued; but, if there was any œdema, treatment was stopped temporarily.

Pyrexia

Pyrexia was observed in 16 patients (2%), all of them female, in whom the incidence was 3%. The pyrexia was generally low-grade (99–100°F) but occasionally rose to 105°F, and usually lasted from twenty-four to forty-eight hours, whether or not treatment with chlorpromazine was continued, but rarely lasted a week. There was no relationship either to the dosage at the time of occurrence, to the total dosage, or to the mode of administration, but with 1 exception it occurred between the fifth and thirteenth days of treatment, with the highest incidence about the beginning of the second week. The 1 exception occurred on the thirty-third day of treatment and was so unusual as to give rise to doubt about whether chlorpromazine could be implicated.

Pyrexia alone was rarely considered to be a contra-indication to continuing treatment with chlorpromazine.

Epileptic Fits

Epileptic fits occurred in 10 patients (1·3%): 4 (1·5%) men and 6 (1·1%) women and had no relationship either to dosage at the time, to total dosage, or to duration of treatment.

6 of the 10 patients had had leucotomy, and 4 of these had had previous fits immediately after the operation but not for many years. The 2 others had not had any previous fits. None of them has had a fit since treatment with chlorpromazine was discontinued.

Of the 4 other patients 1 had arteriosclerotic dementia and although he had had no fits before treatment with chlorpromazine he continued to have them after it was discontinued; 1 was demented as a result of a severe head injury and had a succession of epileptic fits only while she was on treatment; 1 was schizophrenic and had had occasional fits in the remote past but none for several years before treatment with chlorpromazine and none after; and 1 was a schizophrenic who had no fits either before or after treatment with chlorpromazine.

In only 1 of the 10 patients who had epileptic fits had no tendency to epilepsy been observed, but in all of them fits were very rare, had been absent for a long time, and, with 1 exception, have not recurred since treatment with chlorpromazine was stopped. The fits were regarded as a contra-indication to continuing treatment with chlorpromazine.

Discussion

Although the side-effects (as distinguished from toxic reactions) which may be due to chlorpromazine are numerous, the only one of any real significance is hypotension; and, if due caution is taken in elderly patients and those with cardiovascular dysfunction, this only rarely causes any but minor symptoms. It is met with especially during the early stages of treatment with chlorpromazine and when the dose is increased; after this the risk is negligible.

Of the toxic reactions, jaundice and the rare blood dyscrasias are the most important, because both may be fatal. Death due to jaundice has so far only been reported in cases with previous liver dysfunction; therefore this risk may be avoided by regarding such cases as contra-indicating chlorpromazine treatment. Previous bone-marrow dysfunction also contra-indicates chlorpromazine treatment.

Whereas the dosage at the time of the toxic reaction, the total dosage, and the method of administration appeared to be of no significance, the duration of treatment before the reaction was much more constant. The greatest incidence of pyrexia was at the beginning of the second week, and both jaundice and skin reactions came on about two weeks later. Only in the case of epileptic fits was this time relationship not observed. Toxic reactions of any sort, again with the exception of epileptic fits, were very rare after the end of the fifth week, although a large number of cases were treated with chlorpromazine longer than this.

There are two possible explanations. Some people may be particularly susceptible to chlorpromazine, in which case they might be expected to show early signs of toxicity; but then they would also be expected to show other signs of intolerance, and this was not observed. The other and more probable explanation is that the toxic effects are due to sensitisation, though this is curious in view of the known antihistaminic properties of chlorpromazine. Some support is lent to this suggestion by the development of eosinophilia in a few cases. Further, in those cases in which treatment with chlorpromazine was continued regardless of the toxic reaction the toxic symptoms subsided spontaneously and rapidly. The sensitisation hypothesis is therefore worth further investigation.

The fact that the epileptic fits had no relationship either to dosage or to duration of treatment suggests that chlorpromazine has epileptogenic properties which may lead to manifest fits in susceptible people. This is to be the subject of a special study.

Summary and Conclusions

The complications noted in the course of treating 800 patients with chlorpromazine are classified. Such complications may be divided into side-effects and toxic reactions.

Of the side-effects hypotension is the only one requiring special precautions and then only in the aged and those with cardiovascular dysfunction.

Jaundice, blood dyscrasias, skin reactions and œdema, pyrexia, and epileptic fits all occurred as toxic manifestations. Of these jaundice and blood dyscrasias may prove fatal and are regarded as being absolute contra-indications to continuing treatment with chlorpromazine. Previous liver dysfunction may predispose to jaundice and therefore should also be regarded as a contra-indication to such treatment.

With the exception of epileptic fits, the time of occurrence of all toxic manifestations had a definite relationship to the duration of treatment but not to the dosage at the time or to the total dosage of chlorpromazine.

In view of this finding and the occurrence of eosinophilia in some cases the toxic reactions are probably due to sensitisation.

Epileptic fits occurred mainly in post-leucotomy patients, and in only 1 case were no predisposing factors detected. Therefore chlorpromazine may have epileptogenic properties which may cause manifest fits in susceptible people.

ADDENDUM

Since this article was written, J. R. Tasker (*Brit. med. J.* 1955, i, 950) has reported a further fatal case of agranulocytosis due to chlorpromazine.

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CONDITIONING TECHNIQUES IN THE TREATMENT OF WRITER'S CRAMP

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THE treatment of writer's cramp is recognised as most discouraging to patient and therapeutist alike. Though included nosologically with the motor neuroses, writer's cramp has hitherto defied any satisfactory ætiological interpretation in terms acceptable to neurologists, psychiatrists, and psychologists.

Culpin (1931) and Pai (1947) thought that writer's cramp occurred merely as one form of disablement in patients of psychoneurotic constitution, and Glover (1949) considered it to be a typical example of conversion hysteria; but Critchley (1954), affirming that writer's cramp constitutes a specific impairment of motor skill, was at pains to point out that "to look upon the craft palsies as problems in psychopathology has not proved satisfying even to psychiatrists."

In a recent neurological and psychological re-examination of 20 cases of writer's cramp, 1 typist's cramp, and 1 violinist's cramp (to be reported) we concluded that although some of the patients could be regarded as having psychoneurotic tendencies, many showed no evidence of psychological disorder. Indeed, the pattern of mental and emotional make-up of these patients exhibited the widest possible variations. These observations led us to the tentative conclusion that, whatever the origin of writer's cramp, its persistence might be explained by the establishment of a conditioned reflex. The resemblance between the writing in this condition and that observed in certain types of extrapyramidal disease invites the suggestion that this conditioning takes place at subcortical levels, and the partial benefit conferred by the administration of benzhexol hydrochloride ('Artane') affords some support for this suggestion. It seemed from the clinical evidence that, although the loss of acquired motor skill represents a reaction to a total situation involving the act of writing, the sensori-motor circuit could be regarded in terms of afferent stimulus and motor effect. Close observation of the development of the cramp during the act of writing revealed that it tended to arise when the pen or else the writer's hand touched the writing-surface, and was then intensified by the movements of the fingers and thumb as writing proceeded. The trigger stimulus for the conditioned reflex should then be one or both of the following: (1) tactual stimulus of the pen; and (2) tactual stimulus of the hand touching the writing-surface. The motor

DR. LOMAS AND OTHERS: REFERENCES—*continued*

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effect varies from case to case but tends to have two principal components: (1) a tremor of variable rate and amplitude; and (2) a spasm of the muscles of the hand, forearm, and even the upper arm, variable in its extent and intensity but invariably accompanied by excessive pressure of the thumb upon the pen.

Proceeding on the assumption that a conditioning mechanism is at work we reasoned that it might be possible to disturb the reflex by the administration of a sensory counter-stimulus whenever the motor effect took place. After some tentative efforts with feed-back from needle electrodes placed in the muscles of the forearm, simpler techniques were evolved to deal with the tremor and the pressure of the thumb on the pen. It was felt that by attacking these primary manifestations of the motor dysfunction we might break down the whole sensorimotor chain.

To date we have completed treatment of 6 patients with writer's cramp* and 1 with typist's cramp. 2 other patients with writer's cramp are still under treatment. It seems appropriate to give in some detail the histories and course of 2 of the patients with writer's cramp and of the 1 case of typist's cramp. The 2 writer's-cramp cases were selected because 1 had a definite history of psychiatric abnormality and the other was a man whose history and personality were devoid of recognisable psychological disturbance, and in both cases the disturbance of writing comprised both tremor and spasm. The case of typist's cramp is interesting in illustrating a modification of the technique to suit a particular motor problem where the principal disorder was a flexor spasm of certain fingers.

Writer's Cramp

Case 1.—A female typist, aged 49, an intelligent but anxious woman who in the first interviews concealed many facts of her history, passing herself off as single when in fact she had been married and divorced, and had numerous social and personal disturbances in her life. The evolution of her cramp was at once interesting and complex. She took to bookkeeping at the age of 18, and for the next 26 years experienced no trouble with her writing although occupied for six hours each day in ledger work. At 41 she took a different post as a typist, but it was only after three years of this that she developed severe pain in the right thumb. Tenovaginitis was diagnosed. At this time she had already begun to experience stiffness of the whole hand whenever she tried to do her shorthand; and, after an operation had been done to relieve the tenovaginitis, her shorthand became impossible. She then became a copy typist. Thereafter any attempt at writing produced the pain, cramp, and tremor. In 1953, when she was 49, even copy typing produced cramp and pain in the muscles of the right hand, arm, and forearm. Soon after, the cramp began to show itself in other similar movements, and when first seen in March, 1954, she had an almost constant spasm of the muscles of the right arm and hand. An attempt to write produced a slow and painful exhibition

* A further patient has since been treated, a man, aged 53, with writer's cramp of 2 years' duration. Six training sessions produced complete cure, which has been maintained for 1 month to date.

13th August, 1954

The Royal Infirmary
Oxford Road
Manchester.

There was an old man with
a gun who espied an old lady
named Sheasants. She sat on a seat
in the sun and he stared and he
stared most unpleasant.

Fig. 1—Case 1: specimen of writing before (above) and after treatment.

characteristic of writer's cramp. She had been treated with benzhexol hydrochloride without success, had received extensive courses of various sedatives, and had been advised to give up her work. She had become exceedingly depressed and anxious about her condition but was struggling to perform her duties. She subsequently left her work in June, 1954, and review in August indicated a general increase in her depression and despondency, and the cramp and spasm in the right arm had become continuous.

Case 2.—A male clerk, aged 31, noticed in June, 1952, after 2 years in his present post, which involved writing for 4–6 hours each day, that after writing for 5 minutes he developed a tired feeling in the hand and forearm with tremor. On his continuing to write his arm rapidly became stiff, his thumb tensed, his hand tended to turn over, and his writing became illegible. Two weeks' holiday did not produce any change, and treatment with phenobarbitone and benzhexol hydrochloride proved unsuccessful. In May, 1953, he improved a little spontaneously in that the cramp tended to develop after a longer interval and his writing was fairly legible. There had been no discernible change in his personal, domestic, or economic circumstances to explain this change. Re-examination in August, 1954, showed that he wrote slowly, stiffly, and with a tremor, but his writing was rather more legible than when he was first seen. There were no abnormal neurological signs, and no other movement was affected.

Methods and Results of Treatment of Writer's Cramp

As already stated, tremor and spasm are the two components of the motor disorder. These were assailed in the following way. For the tremor a metal plate was drilled with nine holes ranging from $^1/_2$ to $^1/_8$ inch in diameter. The patient was required to insert a metal stylo, held as a pen is held, into these holes, working from larger to smaller as each size was successfully negotiated. Electrical circuits were arranged so that, whenever the stylo touched the side of the holes, the patient received a shock passing from palm to dorsum of the *left* hand.

A second piece of training apparatus consisted of strips of insulating tape arranged in straight, curved, and zig-zag patterns upon a metal plate and so disposed as to call for all the fundamental finger and hand movements required in writing. Again circuits were so devised as to produce an electric shock for the patient should

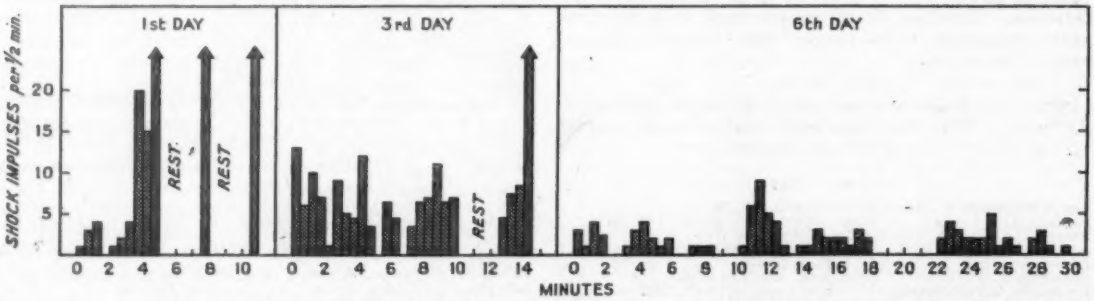
1st DAY
3rd DAY
6th DAY
SHOCK IMPULSES per ½ min.
REST
REST
REST
0 2 4 6 8 10
0 2 4 6 8 10 12 14
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
MINUTES

Fig. 2—Case 2: histograms to show number of shocks produced by thumb spasm per half-minute during training sessions. Arrows indicate continuous spasm.

he deviate in any way in tracing the lined patterns with a metal stylo.

The third retraining mechanism was an ordinary pen adapted in such a manner that excessive pressure of the writer's thumb would again produce a shock. This device was thus triggered by the spasm component of the disorder, in which severe adduction and flexion of the thumb are so prominent.

Case 1.—Treatment was given on 15 successive days, apart from two omissions for Sundays, each session lasting about 30 minutes. The first five sessions were occupied with training on the holes and the tapes. Progress was fitful, but at the seventh session all the holes and the tapes were negotiated successfully, the tremor having disappeared. The next three sessions were spent in writing to dictation with the electrified pen. On the 13th and 14th days writing was almost normal, with no evidence of tremor or spasm. On the 15th day she wrote for 15 minutes without effort and considered herself normal. When last seen three months after completion of the course she had maintained the improvement. She has now returned to work after an absence of three months. Fig. 1 illustrates her writing before and after treatment.

Case 2.—Tremor was less prominent than spasm in this case. After only two sessions the holes and tapes were overcome, and attention was turned to spasm. In six sessions the spasm was abolished and the patient considered himself completely relieved.

Fig. 2 illustrates the progress made: it shows in graphic form the frequency per half-minute of the sounds made by the shocking coil during writing in the first, third, and fifth of these sessions. It will be noted that on the first occasion the thumb went into continuous spasm after five minutes' writing, and that two rest periods did not bring relief. Four months after the end of the treatment this patient is still well and writing normally.

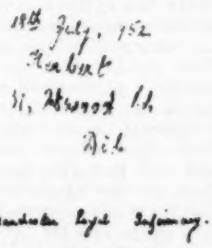

Fig. 3—Case 2: specimens of writing before (above) and after treatment.

Fig. 3 illustrates his writing before and after treatment.

Cases 3, 4, 5, and 6 were all male, and had had writers' cramp for 3–10 years. After 3–5 weeks' treatment they have shown degrees of improvement which we have estimated as 50–85% of their previous normal. The patient whose performance is estimated at only 50% considered himself cured and asked to discontinue treatment since his writing was now to him quite adequate. In the remaining cases the impairment of function comprises either a slight tremor or a lack of fluidity in the writing, and although one of these patients writes for 7 hours each day in his work as a stockbroker's clerk he does experience some aching in his hand after 3 or 4 hours, and so he has been assessed as an 80% improvement.

Typist's Cramp

Case 7.—A female shorthand-typist, aged 32. In 1949, during a period of domestic stress, and after 13 years as a shorthand-typist in an accountant's office, she began to experience mild cramp in the left hand, accompanied by extension of the left forefinger and adduction of the thumb. After 12 months the other fingers began to flex into the palm. In November, 1951, she was seen at the Royal Infirmary, and psychiatric interviews brought no benefit to her condition. In 1952 she changed her employment, and there was some improvement in her domestic background, though there was still cause for anxiety. Her new work was more responsible and more arduous than her former employment, and in August, 1954, a similar but more painful affection of the right hand developed. After 10 minutes' typing the index finger extended, the thumb adducted, and the remaining fingers flexed into the palm with such force as to produce bleeding if she continued. It was in this state that she returned for further advice.

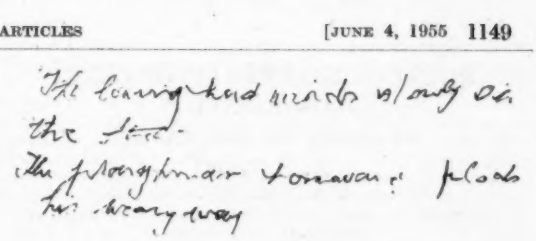

Fig. 4—Case 7: specimens of writing before (above) and after treatment.

Treatment and results.—For this case the apparatus was modified so that a small rubber pad was covered with an interweaving pattern of wire connected to the secondary winding of the induction coil. This pad was then fixed into the palm of the patient's right hand. Thus, any flexion of the fingers into the palm caused a mild shock. The patient was then instructed to type. In three sessions of twenty minutes' duration on successive days a complete cure was achieved, and has been maintained for 6 weeks.

Discussion

Although it is too early to be certain about the long-term effects of treatment, certain preliminary conclusions seem permissible in the light of these experiences. It is encouraging from the clinical point of view to have evolved a means of alleviating a condition which so often has proved intractable. One feels that, in the event of relapse, retraining may be of value, but this remains to be seen. Apart from this, the physiological and pathological implications of the results of this form of treatment are of interest. We suggested above that the acquired motor skill of writing was susceptible to disorganisation by a process of conditioning, and that, irrespective of the initial cause of the disturbance, the conditioned reflex would continue to operate, making normal writing impossible. This heuristic approach to the problem led to the evolution of the method of treatment which really amounts to the extinction of the conditioned reflex which is disorganising the normal pattern of skilled volitional activity. The outcome of this technique of "deconditioning," as it may be called, in patients who differed so much in mental and emotional constitution appears to afford support for our view of the physiological mechanism underlying writer's cramp. Further observation and experiments with the remaining patients are proceeding, after which it may be possible to advance more definitive conclusions.

As regards the technique of treatment it may be suggested that the apparatus merely represents a symbol or a focus for psychotherapy. This suggestion is difficult to refute categorically, but several of the patients had previously had psychotherapy without benefit, and the courses of treatment were arranged so that each patient received treatment sessions from both of us. We feel that this type of therapy can be conducted by anyone with sufficient understanding of the mechanical nature of the disorder to be able to apply the various retraining exercises, and that the psychological element in the treatment is relatively unimportant.

The patients were under the care of Dr. Fergus R. Ferguson, to whom we are further indebted for helpful criticism.

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ROUTINE PREOPERATIVE CHEST RADIOGRAPHY

ANALYSIS OF 1000 CASES

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MASS miniature radiography has shown a small proportion of the public to have undiagnosed pulmonary disease without any specific signs on clinical examination. It is therefore advisable to radiograph the chest of every patient admitted for non-emergency surgery.

The main difficulty about routine chest radiography in the past has been that of expense because 17 × 14 in. films cost 3*s.* 8*d.* each. When, however, this hospital obtained a 5 × 4 in. radiographic camera, the price of each chest film was reduced to just under 5*d.* With the permission of the consultant radiologist and the willing coöperation of the radiographers and nurses, the following routine was instituted.

Routine

Since often the patients were operated on the day after admission, there was no time for the usual procedure of filling in all details on a request form and of receiving a signed report back in the wards. To prevent any delay the sister or the nurse admitting the patient to the ward filled in the request form as a "routine preop." The patient was radiographed the same day, and the film was inspected by the radiologist. Abnormal findings were communicated immediately by telephone to the anæsthetist and discussed between him and the radiologist, the patient was re-examined, and, if necessary, a decision to postpone operation was conveyed to the surgical department concerned.

Analysis

The radiographs were taken between July and December, 1954, and of the 1000 patients in this analysis 447 were male and 553 were female.

Age-groups

The numbers of cases in the different decades were as follows:

Years	0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80 or more
Cases	263	120	111	124	157	97	80	38	10

Proposed Operations

General surgical operations numbered 233, including 43 major abdominal operations.

Ear, nose, and throat operations numbered 347, including 189 removals of tonsil and adenoid, 15 radical mastoidectomies, and 29 submucous resections of nasal septa.

Gynæcological operations numbered 175, including 24 hysterectomies and 35 pelvic-floor repairs.

Orthopædic operations numbered 194, including 6 major operations on the hip and 3 on the spine.

There were 44 *ophthalmic* and 9 *dental* operations.

Radiographic Findings

Of the 1000 cases radiographed 116 films were reported on as abnormal and 29 operations were postponed.

Congenital abnormalities: 9 cases. Only 1 case was of importance, a large pulmonary conus in a child. This case was referred to a cardiological clinic, but no definite diagnosis was made.

Thickened pleura and diaphragmatic adhesions: 14 cases.

Emphysema: 7 cases. One of these showed a localised area of emphysematous bullæ.

Collapse of, and/or infection in, lung: 19 cases. 8 of these were in children and 11 in adults. 6 cases were considered to be minor, and the operation was eventually done as arranged. Of the 13 major infections or collapses 3 were in cases of carcinoma needing immediate treatment. They were given intensive preoperative and postoperative physiotherapy and were operated on under an antibiotic screen, one of them under local anæsthesia. 2 cases were already in the hands of the chest physician, and the operations proposed were part of their treatment. 4 cases had severe collapse and infection, thought possibly to be due to bronchiectasis and were referred 2 to the pædiatric physician and 2 to the chest physician, and the operations were cancelled. 1 further patient refused treatment and discharged himself from the hospital. In the remaining 3 cases, early in the series, reports were received too late and the operation done without preliminary treatment. These 3 patients developed postoperative respiratory complications but responded to treatment, 1 of them needing bronchoscopy before a lower lobe re-expanded.

Tuberculosis: 35 patients were reported as having healed calcified primary complexes, or calcified foci with no evidence of recent disease, or calcified hilar glands. One of these was a child aged 7 years with a report of "calcified lesions at right apex, probably tuberculous"; she was referred to the pædiatric physician for investigation, the operation being postponed until this had been done. 7 adults were reported to have pulmonary tuberculosis. One of these was already known; the 6 new cases were referred to the chest physician for treatment.

Cardiovascular disease: 19 cases of cardiac enlargement or of hypertensive cardiac configuration were reported. Only 1 of these patients had symptoms and was referred to a physician before the operation was done. 5 patients had not only cardiac enlargement but also hilar congestion. 4 of these had already been noted clinically as being in heart-failure, but 1 patient had not. These were all referred to the physician, and their final outcome was as follows: 2 were operated on successfully under local anæsthesia; 2 were operated on under general anæsthesia, and 1 of these, who had a leg amputated for diabetic gangrene, died on the tenth postoperative day; and the fifth patient was not operated on.

Bone metastases: in one film a dense opacity in the 4th rib was reported as being possibly a secondary deposit. Since the proposed operation was prostatectomy, the pelvis and spine were radiographed, and carcinoma of the prostate was diagnosed.

Comment

From this analysis of 100 preoperative chest radiographs it can be seen that 29 patients had their operations postponed or cancelled because of disease first found by radiography. The discovery of 6 cases of new adult pulmonary tuberculosis alone justifies the taking of these films.

The number of abnormal reports correspond reasonably to the figures given by Wachowski (1954), whose series consisted of all admissions to a general hospital in America; and he found rather more rarities. The proportion of new cases of tuberculosis is higher than that found in mass miniature radiography of the general public (Stalker 1954).

It is a great comfort to the anæsthetist to know that the patient has had his chest radiographed; if an abnormality is found, one can get advice or treat it accordingly. All 3 patients with preoperative pulmonary infection notified too late developed severe postoperative pulmonary complications.

I wish to thank the doctors, nurses, and radiographers of this hospital for their help in instituting and continuing this routine; Dr. C. W. Horncastle, consultant radiologist, without whose help it would have been impossible; and Mr. D. W. Bracey, consultant surgeon, for help in preparing this paper.

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RESPIRATORY OBSTRUCTION IN ACUTE LEUKÆMIA

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RESPIRATORY obstruction is a rare manifestation of acute leukæmia, though in chronic lymphatic leukæmia it is relatively common.

Barnick (1898) reviewed the early literature dealing with involvement of the larynx and trachea in leukæmia.

Goedel (1932) saw a case of acute myeloid leukæmia in which there were massive œdema of the aryepiglottic region and a hæmorrhagic mass in the glottis, and necropsy showed a hæmorrhagic deposit over the whole inner wall of the trachea extending into the main bronchi.

Poinso et al. (1953) described a case of monocytic leukæmia in which laryngeal infiltration necessitated an emergency tracheotomy.

A case of monocytic leukæmia was seen by Marks (1953) in which a necrotic membrane involved the left tonsil, the vocal cords, and the trachea.

Israëls (1953) described an interesting case of reticulum-cell reticulosis of leukæmic form in a woman aged 38; her total white-cell count was 2000 per c.mm., and examination of the bone-marrow showed large numbers of the same cells. A tracheotomy had to be done because a subglottic mass, presumably composed of the same cells, had almost obliterated the trachea.

I report here two cases of acute leukæmia presenting as respiratory obstruction.

Case-reports

Case 1.—A Polish housewife, aged 25, was admitted to hospital on April 26, 1954, with six days' history of dyspnœa and swelling of the face.

On examination she was cyanosed and very distressed by dyspnœa, and superior mediastinal obstruction was present with much œdema of the face and neck. Radiography showed an enormous mass of mediastinal glands presumably pressing on the trachea and main bronchi (fig. 1). The total white-cell count was 16,000 per c.mm. (immature cells 0·5%), but the sternal marrow showed acute leukæmia.

Treatment and Progress.—Emergency deep X-ray therapy was given to the mediastinal glands, two opposing fields 20 × 15 cm. (half-value layer 1·5 mm. Cu.) being used, and a dose of 380r was given to the mediastinum in eight treatments spread over nine days. Immediate relief of symptoms followed the first treatment, and by May 7, when the treatment was completed, the patient was breathing normally and the œdema of the face and neck had gone. Her total white-cell count was then 6000 per c.mm. (immature cells 28·5%). Re-examination of the chest showed complete resolution of the mediastinal mass (fig. 2). No further pulmonary symptoms developed. The patient was discharged home but had to be readmitted on May 20 with bleeding from the gums and melæna; her total white-cell count then was 22,000 per c.mm. (immature cells 68%). She was treated with 6-mercaptopurine and cortisone but did not improve and died on June 4, 1954.

Case 2.—A salesman, aged 33, first noticed dyspnœa while cycling in August, 1954, and said he felt "his breath was sticking in his throat." Soon after this he had spasmodic swelling of the face and neck and cyanosis. He was admitted to hospital unconscious on Oct. 29, 1954.

Fig. 3—Case 2: tomogram showing narrowing of trachea from above clavicles to an inch above carina.

On examination he was breathing stertorously, and there were signs of obstruction of the superior vena cava, with gross œdema of the face and neck and congested neck veins. He regained consciousness after four hours, having been given oxygen. Radiography of the chest showed in the superior mediastinum a large mass compressing the trachea just above its bifurcation, and tomography showed considerable narrowing of the trachea from above the clavicles to one inch above the carina (fig. 3). The total white-cell count was 110,000 per c.mm. (blast cells 82·5%). The diagnosis of acute leukæmia, probably lymphatic, was confirmed by examination of the sternal marrow.

Treatment and Progress.—Emergency X-ray therapy was given to the superior mediastinum and trachea, two opposing fields 15 × 15 cm. (half-value layer 1·5 mm. Cu) being used, and a total central dose of 200r was given in three treatments spread over five days. Immediate relief of the respiratory obstruction followed, with disappearance of the symptoms of obstruction of the superior vena cava. Re-examination of the chest showed considerable diminution of the mediastinal

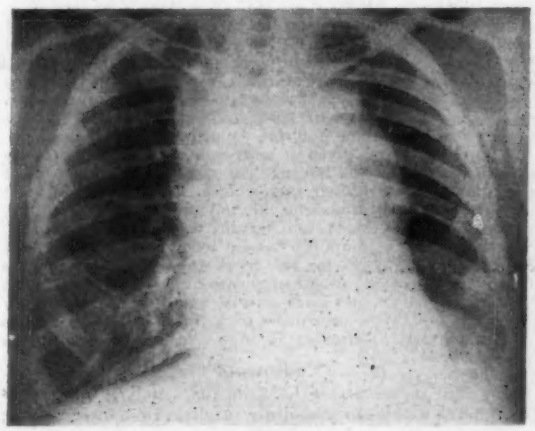

Fig. 1—Case 1: enormous mass of mediastinal glands presumably pressing on trachea and main bronchi.

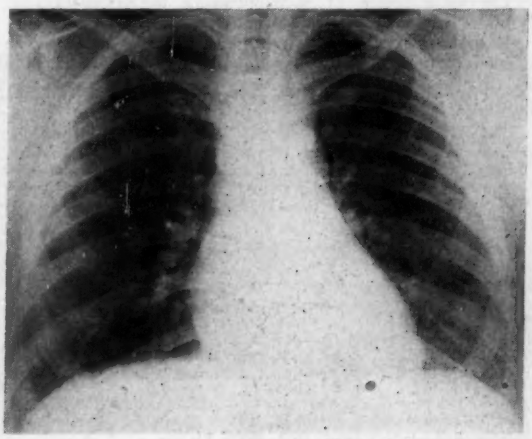

Fig. 2—Case 1: complete resolution of mediastinal glands after radiotherapy.

glands, disappearance of the mass in the trachea, and establishment of a normal airway. The patient has not developed any further symptoms of respiratory obstruction. He is being treated with 6-mercapto-purine, and his general condition and blood-count are satisfactory.

Discussion

In the initial stages of acute leukæmia the lymph-glands are not always palpable, though in the later stages of acute lymphatic leukæmia they may be obviously enlarged. The condition in which there are an infiltrating lymphosarcoma and a leukæmic blood picture may be termed leucosarcoma, and the two cases reported here come into this category.

Sternberg (1915) first described leucosarcoma and considered that it differed from leukæmia and from lymphosarcoma, but this view is not held now (Whitby and Britton 1953). In a series of cases of acute leukæmia reported by Hrodek (1953) only 10% were characterised by swellings; in this group were seen cases showing swelling of the mediastinum, tumour-like infiltration of the skin, and multiple infiltrations of various organs. It is of considerable importance to distinguish, by examination of the blood and sternal marrow, between cases of leucosarcoma and of lymphosarcoma involving only one group of lymph-glands, because the prognosis in leucosarcoma is hopeless, whereas in lymphosarcoma the five-year survival-rate is 50% (Boden 1951).

Acute respiratory obstruction due to malignant disease, most often carcinoma of the bronchus, is one of the few radiotherapeutic emergencies. Immediate treatment, though not curative, will usually give instant relief from imminent suffocation and death. It is generally accepted that radiotherapy is contra-indicated in acute leukæmia (Whitby and Britton 1953, Paterson 1953); but in leucosarcoma presenting with acute respiratory obstruction radiotherapy seems to be of considerable value and may relieve the obstruction and make tracheotomy unnecessary in cases involving the larynx, such as those reported by Poinso et al. (1953) and Israëls (1953). Leucosarcoma is an extremely radiosensitive tumour, and only very small doses of X rays must be used. The response to radiotherapy is very rapid, and the treatment must be given with much care and stopped as soon as the symptoms have been relieved.

Summary

Two cases of acute leukæmia presenting as respiratory obstruction are described.

In each case complete and permanent relief of the obstruction followed small doses of X rays.

The importance of distinguishing between unifocal lymphosarcoma and leucosarcoma is emphasised.

Radiotherapy is usually completely contra-indicated in acute leukæmia, but it will relieve respiratory obstruction in this disease; it must be given with the greatest caution.

I should like to thank Prof. J. S. Mitchell, F.R.S., for permission to publish and for helpful criticism; Sir Lionel Whitby, Dr. L. C. Martin, and Dr. A. P. Dick for permission to publish; Dr. F. R. Berridge for the radiographs; and Miss Sylvia Westoby for printing them.

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INTRA-ARTERIAL TRANSFUSION IN DIABETIC COMA

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SURGEONS used to dealing with severe states of shock following massive hæmorrhage and tissue damage have quickly come to realise the value of intra-arterial transfusion in resuscitating the nearly moribund patient whose systolic blood-pressure has dropped below 70 mm. Hg. Because intravenous transfusion of blood has little effect in restoring a normal circulation in such cases, the term irreversible shock has often been used in the past.

Intra-arterial transfusion has also been used with success for severe shock in medical conditions, such as cardiac infarction and various types of embolism. We record a case of diabetic coma in which peripheral circulatory failure had reached a stage which would in the past have been considered irreversible, and in which an intra-arterial transfusion of two pints of blood was the turning-point towards eventual recovery.

Case-report

A woman, aged 63, not previously known to be diabetic, who had complained of anorexia and constipation for two months, began to vomit profusely thirty-six hours before admission. She became drowsy and finally comatose twelve hours before admission.

On examination she was obese but extremely dehydrated, with respirations deep and hungry, extremities cold, temperature 97°F, and blood-pressure 80/60 mm. Hg. Her urine contained glucose and acetone. Her blood-sugar level was 463 mg. per 100 ml., and bicarbonate 19·5 vol. %.

Treatment and Progress.—She was given 25 units of soluble insulin intravenously and 75 units intramuscularly, and intravenous therapy was started with physiological saline solution 400 ml. A blackish foul gastric residue was aspirated. After two hours the blood-sugar level had risen to 800 mg. per 100 ml. and the blood-pressure had fallen to 50/25 mm. Hg. Insulin 160 units was given, and intravenous dextran was substituted for the saline solution. Venous spasm, persisting after the injection of procaine, prevented very rapid transfusion, and signs of pulmonary œdema began to appear five hours after the start of treatment. At this time the blood-sugar level was 650 mg. per 100 ml. and the blood-pressure 55/40 mm. Hg. The patient was cold and livid, her breathing was stertorous, and the end seemed imminent. A pint of blood was then transfused into the right radial artery in ten minutes, the general condition improved, and the blood-pressure rose to 100/65 mm. Hg. A further pint was then given in five minutes, with a further improvement in general condition. An hour after the beginning of intra-arterial transfusion the blood-pressure was 115/75 mm. Hg and the patient's extremities were warm. Intravenous therapy was continued through a polyethylene catheter in the left saphenous vein, 2 litres of 1/6 *M*/sodium lactate and $^3/_4$ litre of physiological saline solution being given in four hours. Insulin 60 units was given at hour eight, and at hour ten the blood-sugar level was 246 mg. per 100 ml. Thenceforward treatment was continued with sodium lactate, physiological saline solution, and potassium chloride intravenously according to the estimated needs, and insulin was given four-hourly. After twenty-four hours the patient was just able to swallow fluids; and, although for two more days her condition was critical and recovery was complicated by sepsis at the sites of the intravenous and intra-arterial transfusions, by urinary infection, and by a recurrence of iritis in one eye, she has eventually been stabilised on 70 units of insulin-zinc suspension ('Lente').

Comments

In the experience of one of us, such a degree of peripheral circulatory failure in diabetic coma always presages death, and accelerating the rate of intravenous infusion, even if that is possible, seems to precipitate

pulmonary œdema. Intra-arterial transfusion, although an unusual method of treatment, seemed to offer the only hope of halting the cycle of events leading to circulatory failure and death.

The transfusion was effected with a Hamilton Bailey cannula tied into the radial artery just above the wrist and connected to a form of pressurised-saline outfit on a stand, which has been in regular use in Frenchay Hospital, Bristol, since 1948, mainly for angiography, principally carotid (Mortimer and Gaskell 1954). Alternative routes, perhaps preferable from the point of view of maintenance of continuity of the artery, would be either percutaneous introduction of a 6-in. B.W.G. no. 17 needle into the femoral artery, or direct puncture of the brachial artery at the elbow after exposure. The use of a Mackintosh and Pask safety drip chamber excludes the possibility of air-embolism, but the blood has to be prefiltered, no filter being provided with the apparatus.

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HYPERSENSITIVITY ANGIITIS

REPORT OF A CASE

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SINCE Kussmaul and Maier (1866) first described periarteritis nodosa, this term has been used to describe various conditions, the common factor being a generalised arteritis or angiitis, varying in type and distribution.

Numerous cases of periarteritis have been attributed to sensitisation to drugs—e.g., sulphonamide (Rich 1942, More et al. 1946), sulphathiazole (Lichtenstein and Fox 1946), thiouracil (McCormick 1950), thiourea (Gibson and Quinlan 1945), penicillin (Surdakowski 1954, Adelson 1951), organic arsenicals (Miller and Nelson 1945), dilantin, aspirin, and Lugol's iodine (Rich 1947); and the resulting lesions, which differ in some respects from those of classical periarteritis nodosa, have been called hypersensitivity angiitis (Zeek 1952, Knowles et al. 1953). We have not been able to trace any reference to hypersensitivity angiitis following the administration of streptomycin or of isoniazid.

Another important group of cases of periarteritis nodosa is often associated with hypertension and renal impairment and has been called "microscopic periarteritis nodosa" (Davson et al. 1948, Wainwright and Davson 1950).

Additional descriptive terms used for members of this group of diseases include polyvasculitis (More et al. 1946), primary and secondary periarteritis nodosa, allergic granulomatous angiitis, rheumatic arteritis, temporal arteritis (Zeek 1952), polyarteritis nodosa, and necrotising arteriolitis (*Lancet* 1954).

The importance of a better understanding of these diseases has recently been emphasised (*Lancet* 1954), particularly because a possible means of treatment is now available in corticotrophin and cortisone. The present case is reported as an example of hypersensitivity angiitis, in which death occurred suddenly during treatment with cortisone.

Case-report

Mrs. A., a housewife, was treated in 1951, at the age of 30, for a sterile mammary abscess, which settled completely a few days after incision; a chest radiograph at that time was normal.

She remain well until April, 1954, when she developed suppurative otitis media, which was treated with systemic penicillin. This had to be discontinued after a few days because of fever and a general rash; shortly after this she developed right-sided pleuritic pain, which persisted. On May 29, 1954, radiography of the chest showed two dense homogeneous rounded opacities in the lower zone of the right lung, one 2 cm. in diameter lying at the anterior end of the greater fissure, and the other (6 cm. in diameter) lying posteriorly in the costophrenic sulcus (fig. 1).

She was first seen by one of us on June 24, when the right pleuritic pain had been worse for the past few days. She was found to have a small right pleural effusion, and she was admitted to hospital the same day. The effusion was clear and contained lymphocytes, but no tubercle bacilli were found on direct examination or culture. The diagnoses considered at that time included secondary carcinoma, tuberculomata, pyæmic abscesses, and infarcts. In the absence of any evidence of a primary carcinoma a course of anti-tuberculosis chemotherapy was started, the intention being to proceed to thoracotomy if the diagnosis remained in doubt. The effusion cleared in two weeks, leaving the diaphragm considerably raised, and subsequently the rounded lesions were not radiologically visible.

Course of Illness

Treatment with streptomycin 1 g. daily and isoniazid 200 mg. daily was started on June 28. On July 4 she had fever (102°F) and a general maculopapular rash, which she said was exactly like what she had had after treatment with penicillin. The pyrexia increased, and on July 6 streptomycin therapy was discontinued, and full doses of promethazine ('Phenergan') were given. Isoniazid therapy was not discontinued until July 8. The pyrexia, which had remained at 104–105°F until July 8, gradually settled to about 100°F; at this time there was eosinophilia (594 per c.mm.), which was not maintained.

By July 10 the rash had largely cleared, but on the 14th she developed acute retention of urine, requiring an indwelling catheter; at the same time all the tendon-jerks were brisk, those in the right leg being much increased. The plantar responses were flexor, and the abdominal reflexes present; there were no sensory changes. Her general condition remained poor, drowsiness being a striking feature; the skin of the legs had started to desquamate. The blood-pressure was 115/70 mm. Hg and blood-urea level 22 mg. per 100 ml.

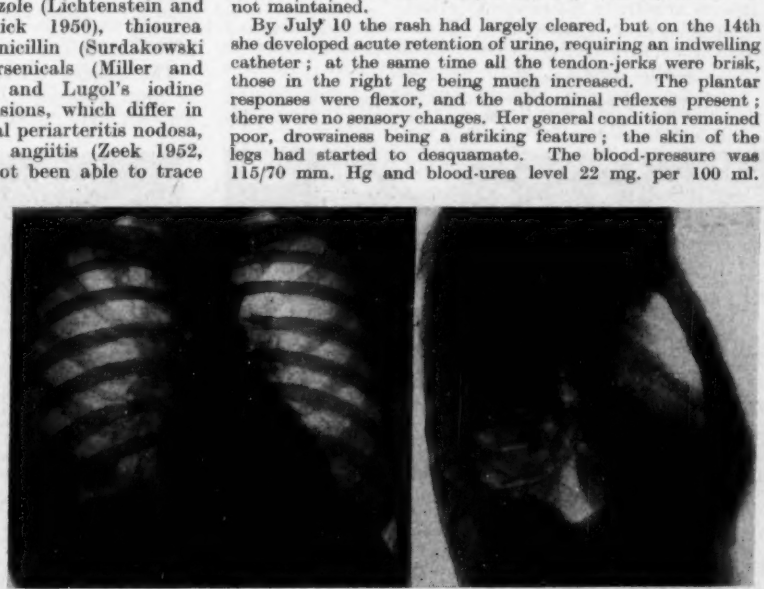

Fig. 1—May 29, 1954: two dense homogeneous rounded opacities in lower zone of right lung, one lying at anterior end of greater fissure and the other posteriorly in costophrenic sulcus.

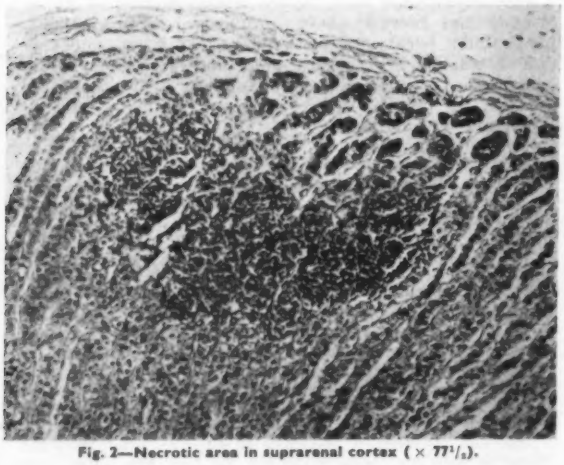

Fig. 2—Necrotic area in suprarenal cortex (× 77½).

The right fundus oculi was normal, but there were two well-defined patches of exudate on the nasal side of the left disc; there was one perivascular exudate on the temporal side of the disc but no hæmorrhage or papilloedema.

On the evening of July 14 she had signs of a pulmonary embolism in the left lower lobe, apparently arising from thrombophlebitis in the left calf. Anticoagulant treatment with heparin and phenylindanedione ('Dindevan') was started but had to be stopped after twenty-four hours because of gross hæmaturia.

All drugs were now discontinued, and the patient gradually improved. Extreme drowsiness remained the chief feature of the clinical picture. By July 26 the neurological signs had completely regressed, and micturition was normal, but slight desquamation was now general.

On Aug. 10 a test dose of intramuscular streptomycin 0·1 g. was followed by mild evening pyrexia (99·2°F) and next day by aching finger-joints and back for a few hours. On Aug. 13 a test dose of isoniazid 20 mg. was followed by evening pyrexia (100°F) and next day by severe bilateral conjunctivitis; and the pyrexia subsequently gradually increased to 102·4°F. The eye condition progressed and presented a picture indistinguishable from phlyctenular conjunctivitis due to sensitivity to tuberculo-protein; a Mantoux test, with 1/1000 O.T. was negative. Drowsiness increased, and the patient complained of stiffness in all her joints.

Treatment with Corticotrophin

Polyarteritis being suspected, treatment with corticotrophin 100 mg. daily was started on Aug. 19. The following day the temperature returned to normal, and the eyes, though still injected, were very much improved. The dosage of corticotrophin was reduced after two days to 75 mg. daily, and after another two days to 50 mg. daily. On Aug. 23 the patient's condition again deteriorated, with pyrexia (101°F) and a relapse of the eye signs. Next day treatment with cortisone acetate 25 mg. six-hourly by mouth was started and continued until Aug. 30, no corticotrophin being available. During this period she was maintained on a low-salt diet and her intake of fluids was restricted to two pints daily.

On Aug. 29 she complained of breathlessness and retrosternal tightness, and on auscultation there were abundant râles throughout both lungs. On the 30th the blood-urea level was 300 mg. per 100 ml., compared with 22 mg. two weeks previously. The blood-pressure was 120/80. Electrocardiography showed no abnormality other than prominent T waves, presumed to be associated with the uræmia. Radiography of the chest showed diffuse shadowing in keeping with pulmonary œdema. The symptoms became worse, and the patient produced copious pink frothy sputum. She died on Aug. 31.

Necropsy Findings (Sept. 1)

External examination showed an operation scar below the right breast and some exfoliation of the skin of both legs. A little free fluid was found in the left pleural cavity. Both lungs had firm dark-red areas at the bases with overlying fibrinous pleurisy, the rest of the lungs being œdematous. The myocardium was pale; otherwise no cardiac abnormality was found. The kidneys were swollen and had pale mottled cortex. The spleen was moderately enlarged, firm, and pale at the surface, with perisplenitis. The liver was somewhat pale. The other organs appeared normal to the naked eye.

Histological Examination

Kidneys.—Widespread fibrinoid necrosis of the glomerular tufts, with polymorph infiltration around the capsules. Many tubules contained hyaline and leucocytic casts and red blood-cells. The interstitial tissue showed round-cell and polymorph infiltration. No evidence of arteritis was seen in any of the larger vessels examined.

Lungs.—There were numerous areas in which the alveoli contained fibrin, red cells, and polymorphs; the arteries in these areas being involved by polyarteritis. There was no evidence of tuberculosis or of pulmonary sepsis.

Suprarenals.—Small areas of necrosis in the cortex of both glands (fig. 2); no involved vessels were seen in the gland substance, but several were affected in the surrounding fat, including a small vein (fig. 3).

Small arteries in the *heart* (fig. 4), *spleen*, and *portal tracts* were affected.

The lesions corresponded in nature and distribution to those described by Zeek (1952) as hypersensitivity angiitis, and, except for the involvement of a small

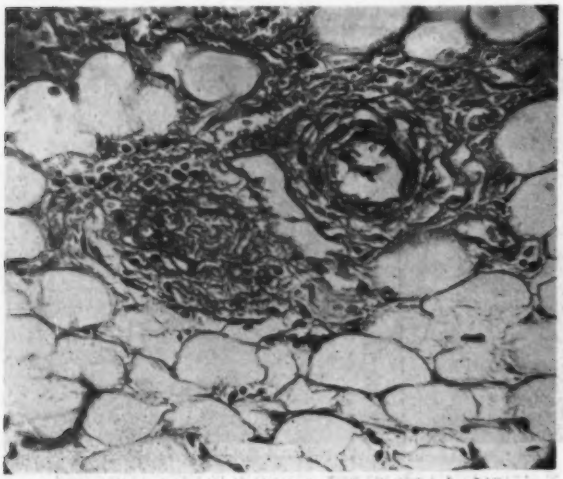

Fig. 3—Affected arteriole and vein in perinephric fat (× 244).

Fig. 4—Affected coronary artery (× 25)

vein, to those described by Davson et al. (1948) as microscopic periarteritis nodosa.

Discussion

We now believe that the round opacities seen in the right lower zone of the chest radiograph in April, 1954, were due to infarcts, and postulate that arteritis had already developed, probably as a result of sensitisation to penicillin in March, 1954. Subsequently this condition appears to have been aggravated by the exhibition of further antigens in the form of streptomycin and isoniazid after a tentative but mistaken diagnosis of tuberculosis. It was not until the patient had recovered from the more usual effects of sensitisation to these drugs (pyrexia, exfoliative dermatitis, and hyperreflexia) and developed a progressive and obscure illness following exhibition of single small test doses that a collagen disease was suspected.

She was then treated with corticotrophin, and later cortisone; but after two weeks, during which her clinical condition improved somewhat, she developed acute fatal cardiorenal failure. At no time was the blood-pressure raised.

Zeek (1952) suggests that, since periarteritis nodosa and malignant hypertension have been produced in rats by the administration of either adrenal or pituitary hormones, it may be dangerous to use cortisone or corticotrophin in cases with certain types of necrotising vascular lesions. Rich et al. (1950), in experimental work on rabbits, in which periarteritis nodosa and glomerulonephritis were induced by sensitising them to horse-serum, found that, whereas corticotrophin prevented the development of the renal lesions, cortisone, in contrast, induced a severe hæmorrhagic type of glomerulonephritis, which was distinct from the proliferative variety resulting from sensitisation.

More recently several workers have described instances where periarteritis nodosa was possibly caused by treatment with these hormones:

Levin et al. (1953), reviewing 50 patients with rheumatoid arthritis treated with cortisone and corticotrophin, mention 3 who developed histologically proved periarteritis nodosa (1 during treatment, and 2 shortly after treatment with the hormones was withdrawn). They point out that other collagen disorders may coexist with rheumatoid arthritis (Bauer et al. 1952).

Robinson et al. (1953) describe 4 patients with rheumatoid arthritis who developed diffuse arteritis, of whom 3 had been treated with corticotrophin and 1 had not.

A similar case of polyarteritis nodosa developing during cortisone treatment of rheumatoid arthritis is described by West and Newns (1953).

Corticotrophin has been incriminated as the cause of serious or fatal allergic reactions.

H. T. Howat, cited by Savidge and Brockbank (1954), and Hill and Swinburn (1954) each report a fatality following injection of corticotrophin, due to anaphylaxis.

Nabarro (1954) remarks on the danger of allergic reactions to corticotrophin, particularly where the adrenal glands fail to respond and the level of circulating steroid hormones is low.

Stoner and Whiteley (1954) found that the adrenals of 4 patients who died under treatment with corticotrophin were hypertrophied, whereas those of 3 patients who died under treatment with cortisone were atrophied and inactive. Whereas the diseases being treated with corticotrophin were sufficient to account for death, those being treated with cortisone were not. The adrenals of the present patient, who received both hormones for only short periods, showed numerous small areas of necrosis.

We offer no explanation for the course of events in the case we describe, but we believe that the possibility that the patient became sensitised in turn to the hormones, with further aggravation of the generalised angiitis, cannot entirely be ruled out. The experimental work of Rich and his associates suggests that, in the present state of knowledge, patients with any form of polyarteritis should be treated with corticotrophin rather than cortisone, in view of the possible nephrotoxic action of the latter hormone.

Summary

A case is described in which generalised hypersensitivity angiitis developed, evidently as the result of sensitisation to penicillin, streptomycin, and isoniazid.

Death took place suddenly from acute cardiorenal failure during treatment with cortisone.

Our thanks are due to Mr. H. C. Taylor for the photomicrographs.

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CONGENITAL DIAPHRAGMATIC HERNIA IN A PREMATURE INFANT

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EARLY diagnosis and immediate surgical intervention are largely responsible for the progressive decline in the mortality from congenital defects of the diaphragm. At one time surgical opinion favoured postponing the operation until the child was 1 or 2 years old, but Hedblom (1925) showed that three-quarters of these infants died before the end of the first month.

In the last decade it has been established that during the first 48 hours of their life infants can withstand major surgical procedures which they will not tolerate later. The early operation has the added advantage that, during the first 2 days of life, the intestines are not yet distended with gas, and repositioning is easier. This is a serious problem in congenital diaphragmatic hernia, because the capacity of the abdominal cavity is considerably reduced.

In infants who are operated on after the first 2 days, replacement of the viscera and closure of the abdominal wall, if possible at all, gives rise to serious cardiorespiratory embarrassment, which often proves fatal. Ladd and Gross (1940) were the first to advocate a two-stage closure of the abdominal wall in certain cases, and this proved an important advance in treatment.

Other important causes of the progressive decline in mortality have been the segregation of these cases in pædiatric and thoracic surgical centres, improved techniques in anæsthesia, and the better understanding of preoperative and postoperative treatment in neonatals.

Several large series have now been reported, including those by Hartzell (1940), Harrington (1948), Gross

Fig. 1—Radiograph of chest before operation.

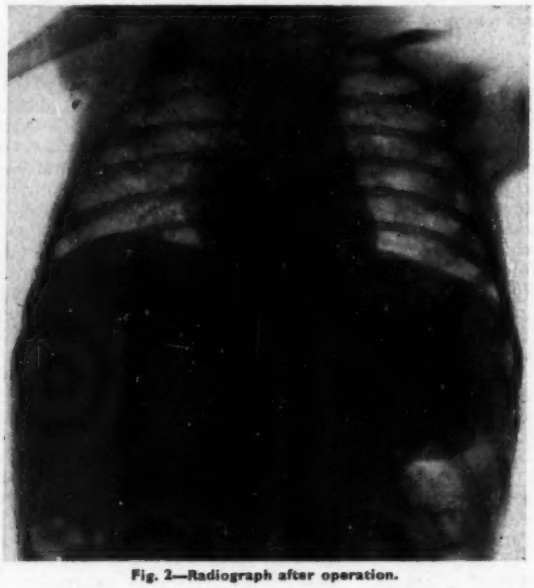

Fig. 2—Radiograph after operation.

(1953), and Ricker (1954). My justification for recording a single case only is that it shows that success is possible in a poor-risk subject, in the absence of modern anæsthesia and specialised nursing. This may encourage surgeons who work in parts of the world where such important aids to surgery are not available.

Case-report

A premature male Indian infant, who weighed 4 lb. 8 oz. at operation, was noticed to be cyanosed on the third postnatal day. The cyanosis progressively increased, and the infant began to have attacks of respiratory embarrassment and vomiting during feeding. Despite these ominous signs a careful examination was not made, and penicillin was given empirically for what was thought to be a respiratory infection. Though there was no improvement in his condition, the chest was not radiographed till the twelfth day. The film revealed a diaphragmatic hernia with many loops of gas-filled intestine filling the left hemithorax (fig. 1). The infant was accordingly referred for surgical treatment.

On admission he was cyanosed, dyspnœic, and dehydrated. The apex-beat was in the right anterior axillary line, and the abdomen was scaphoid.

Dehydration was corrected with subcutaneous half-normal saline given through a drip with the aid of hyaluronidase, and gastric suction was begun.

Operation

After a left phrenic crush, the abdomen was opened through a left paramedian incision extending from the costal margin to below the umbilicus. Anæsthesia consisted in local infiltration of the line of the incision with 1% procaine and adrenaline 1 in 500,000; very small amounts of ether were given, using an open mask, with oxygen supplied through an intranasal catheter.

The hernia was through the patent left pleuroperitoneal canal—the so-called foramen of Bochdalek. The hernial contents were gently reduced after air had been admitted to the pleural cavity through a soft rubber catheter. As is usual in this type of hernia, there was no sac.

The organs which had herniated were the left lobe of the liver, the stomach and first part of the duodenum, the jejunum, the ileum, the cæcum, ascending colon, transverse colon, the tail and body of the pancreas, and the spleen. It was at once apparent that it would be impossible to replace all these viscera in the underdeveloped abdomen. A two-stage reduction was therefore decided upon.

The hernial orifice was repaired in two layers with mattress sutures of fine braided nylon, without preliminary paring of the diaphragmatic edges. As the last suture was being tied, air was evacuated from the pleural cavity through a fine catheter attached to an abdominal sucker.

The skin and subcutaneous tissues at the sides of the abdominal incision were widely undermined. As much of the bowel as possible was returned to the abdomen, and the rest was left under the sutured skin as a ventral hernia.

Postoperative Progress

At the end of the operation the infant's condition was fairly satisfactory. He was placed in an incubator and remained there for 5 days. Gastric suction and subcutaneous fluids were continued for 24 hours, when feeding with expressed breast-milk was begun. Penicillin 100,000 units twice daily and ascorbic acid 250 mg. daily were given postoperatively.

As the infant's condition remained completely satisfactory and a radiograph of the chest showed full expansion of the left lung (fig. 2), it was decided to repair the ventral hernia on the 7th day. However, examination of the abdominal wound on that day showed a moderately severe wound infection, though there was no pyrexia. (A swab from the wound subsequently grew a penicillin-insensitive *Staphylococcus aureus*.) Operation was postponed and the wound treated with 5% chloramphenicol in propylene glycol, while chloramphenicol palmitate (100 mg. 8-hourly) was given by mouth.

The wound infection had cleared up by the 14th postoperative day, and 2 days later the ventral hernia was repaired and the abdominal wall closed in layers.

Recovery from the second operation was uneventful, and the wound healed by first intention. The infant was discharged from hospital 3 weeks later, by which time he was gaining weight normally. Subsequent progress was satisfactory, but when the child was last seen, a year later, radiographic screening showed that the left diaphragm was raised, and paradoxical movement indicated that the paralysis had not recovered.

Comment

Ladd and Gross (1940) originally advised preliminary crushing of the phrenic nerve to decrease tension on the diaphragm caused by suturing the opening. Healing takes place satisfactorily without this aid, and Gross (1946) has since abandoned the procedure because—as in this case—the paralysis of the diaphragm is sometimes permanent.

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Reviews of Books

The Physician and His Practice

Editor: JOSEPH GARLAND, M.D., editor, *New England Journal of Medicine*. Boston and Toronto: Little, Brown. 1955. Pp. 270. $5.00.

IN this "source book of information regarding his career . . . for the young doctor" in the United States, 18 contributors (13 medical, 5 lay-expert) survey the whole field of medical practice—opportunities, obligations, rewards, and perils, and give detailed advice on all except clinical matters to the intending general practitioner. For the British reader its interest lies in comparison. It seems that fragmentation of medicine has gone further there even than here so that general practice in cities has become something very different from ours. In small towns and the country, however, the "generalist" may fully deserve that title, besides having his part to play in vigorous and abounding social and communal life. Graduation to special through general practice still occurs, and group practice of various kinds is increasing. In one respect the American G.P. scores heavily: it seems to be recognised that wherever he may practise he must in some way be affiliated to a hospital, "since he will stifle medically without it." "Perhaps," Dr. Garland comments, "a way will be found to modify the present scheme in Britain and give the general practitioners some access to hospitals. It would seem a safe assumption that if this is not done the caliber of general practice is likely to deteriorate in time."

Hey Groves's Synopsis of Surgery

Editor: SIR CECIL WAKELEY, BT., K.B.E., C.B., LL.D., F.R.C.S., senior surgeon, King's College Hospital, London. Bristol: John Wright & Sons. 1954. Pp. 660. 30*s*.

THERE is a great deal to be said for this synopsis, used when an ordinary treatise of surgery has been read and re-read. For revision in the last month or so before an examination, and as a companion at outpatient clinics and round the wards, it is invaluable. Its merit resides in its ultimate degree of terseness; a treatment may be summarised in a single word capable of recalling a memory. It saves the student from re-reading what he already knows, but forces him back to his textbook for what he has forgotten. Students owe a debt of gratitude to Sir Cecil Wakeley for editing this new edition.

X-ray Atlas and Manual of Esophagus, Stomach and Duodenum

Dr. T. J. J. H. MEUWIESEN, consulting physician and radiologist at Eindhoven, The Netherlands. Amsterdam and New York: Elsevier. London: Cleaver-Hume. 1955. Pp. 687. £8 15*s*.

IN the introduction to this work we are told that material for it has been gathered from twenty-five years' experience in gastro-intestinal radiology. Nearly 500 cases are described briefly and are very well illustrated. This mass of clinical material would have made the book difficult to read if the author had not adopted the method he has done: after a comparatively short and very practical survey of the anatomical arrangement and diseases in different regions, he groups the illustrative cases as a block. The illustrations are, of course, keyed to the text, so it is possible to use them as references either independently or in conjunction with the text. A short appendix deals with the stomach after operation. No attempt has been made to include references to published works. This is a very helpful book, and well produced.

Management of Endocrine Disorders of Menstruation and Fertility

GEORGEANNA SEEGAR JONES, M.D., assistant professor of gynecology, Johns Hopkins University. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1954. Pp. 198. 42*s*.

THIS book is written "for the medical student and physician, be he specialist or practitioner"; but it is better suited to be a primer for student endocrinologists. The pituitary and gonadotrophic hormones have certainly been called by many different names, and are assayed in many different ways by many different workers; but nine-tenths of these early confusions might have been relegated to an appendix, or at least to footnotes. Here and there the clinician will prick up his ears, hoping to learn something to his advantage; but the imprint of clinical experience seems to be lacking. A discussion on delayed menarche, for instance, gives the impression that imperforate hymen is high on the list of causes. Treatment of the menopause is dismissed in only one short page; the suggestion that stilbœstrol should be given in doses of 1 mg. daily is not likely to commend itself to most recipients, and the reader, having been advised that œstrogen treatment "must be discontinued as rapidly as possible," is then told that "pellet implantation is most satisfactory, when feasible."

Psycho-chirurgie et fonctions mentales

J. LE BEAU. Paris: Masson. 1954. Pp. 430. Fr. 3300.

IN this book Dr. Le Beau, a neurosurgeon who has worked particularly in the field of psychosurgery, reviews the practice of cerebral surgery in mental illness, including intractable painful states.

After a brief section on the anatomy and physiology of the frontal lobes and their related structures in the thalamus, diencephalon, and brain-stem, he discusses, mainly in terms of Eysenck's theories of "neuroticism" and "psychotism," the psychological functions involved in the mental diseases treated. He goes on to describe his own experience and gives details of the operative techniques he uses and their possible surgical and medical complications. The main part of the book is taken up by a review of the indications for the different operations and their clinical results both in mental disease and for the treatment of intractable pain. This section contains a full discussion and assessment of Dr. Le Beau's own results, in which postoperative psychological changes have been assessed by Mrs. A. Petrie. There are also brief chapters on temporal-lobe surgery in conduct disorders and on the placing of selected lesions in the subcortical nuclei of thalamus and basal structures by means of the stereo-encephalotome. In a final chapter on physiological interpretations there is perhaps a tendency to assign rather naïvely symptomatic changes to specific cortical areas and cerebral structures.

In general, however, this work covers psychosurgery more fully than many earlier books, which have tended to deal largely with one operation, and surgeons will find it a valuable source of reference.

Manual of Hand Injuries

H. MINOR NICHOLS, M.D., clinical instructor in surgery, University of Oregon Medical School, Portland. Chicago: Year Book Publishers. London: Interscience Publishers. 1955. Pp. 352. 72*s*.

WELL illustrated and attractively presented, this book provides a complete picture of the problems arising in the treatment and care of injuries of the hand—including amputations, burns, tendon and muscle injuries, nerve injuries, fractures, and dislocations. It also deals with infections, secondary tendon repairs, and more complicated reconstructive procedures. The text indicates the tendency towards more serious study and care of hand injuries, and the trend in the better hospitals to make the casualty department rather more than a reception station. It is a treatise that is of the greatest value to surgeons concerned with the treatment of such injuries, and can be strongly recommended.

The Origins and History of Consciousness

ERICH NEUMANN. Translator: R. F. C. HULL. London: Routledge & Kegan Paul. 1954. Pp. 493. 30*s*.

FROM any reader not familiar with the Jungian modes of thought and language, this book demands steady concentration, an unlimited capacity to digest abstractions, and a considerable tolerance for ponderous and imprecise argument. If he can bring these rare attributes, he will be rewarded by many unusual and stimulating connections that are suggested between the primitive or archetypal phases of the development of consciousness in individuals and the mythological symbols and tales which are projections of the collective unconscious of mankind. The work is essentially an esoteric study in individuation; it seeks to relate ontogenesis to phylogenesis. As always in Jung's analytical psychology,

the apparatus of scholarship is fully deployed, and the writer shows a wide acquaintance with ancient religious and ethnological writings, especially those concerned with the ubiquitous symbol of the Uroboros—"the circular snake, the primal dragon of the beginning that bites its own tail." Cursory exposition of the way Dr. Neumann develops his theme is impossible, because of the unconventional line of thought and the range of issues traversed.

Abdominal Operations (3rd. ed. London: H. K. Lewis. 1955. Pp. 1580. £8 10*s*.).—Mr. Rodney Maingot's work has an established place in British surgical literature, and the third edition has broadened its scope. There are now 24 contributors, 8 from overseas, chosen for their expert knowledge in a special subject, and a detached and reasoned approach to each topic is maintained throughout, with ample references. The number of illustrations has been increased considerably. The revision required for this edition must have been a considerable undertaking, but it has been well worth while.

Cold Injury.—The Josiah Macy, jun., Foundation, New York, has published the transactions of the conference on this subject held in February, 1954. The editor is Dr. M. Irené Ferrer. (1955. Pp. 226. $4.50.)

Technique and Significance of Œstrogen Determinations.—The proceedings of a conference on this subject held by the Society for Endocrinology and the endocrinology section of the Royal Society of Medicine in February, 1954, have been published as no. 3 of the Memoirs of the Society for Endocrinology. The editors are P. Eckstein and S. Zuckerman. Beginning with this number, the Memoirs are being published by the Cambridge University Press, from which copies of Memoirs 1–3 can be obtained. (1955. Pp. 95. 18*s*.)

New Inventions

A RULER FOR USE IN ELECTRO-ENCEPHALOGRAPHY AND ELECTROCARDIOGRAPHY

THE measurement of frequency of waves, occurring in short bursts in electro-encephalograms, with a centimetre ruler is tedious and not alleviated by the wave analyser, which analyses epochs of ten seconds. To make such measurements easier a ruler has been designed to measure frequency and amplitude of waves. The same ruler can also be used for measuring intervals in seconds and cycles per minute so that it is possible to analyse an electrocardiogram displayed on plain paper. The ruler is simple to make and does not require the skill of an instrument maker. This is important because the dimensions of the ruler are determined by the paper speed of each instrument.

The ruler is made by etching lines on a piece of 'Perspex' 8 cm. × 12 cm. × $^1/_8$ in. A triangle is etched whose base is 6 cm. (or the distance moved by the paper in 2 sec.) and vertical height 10 cm. The base is divided into six equal parts, and the divisions are joined to the apex of the triangle. From the two lines adjacent to the vertical, horizontal lines are etched towards the edge of the ruler, the ones on the right indicating cycles per second (C.P.S.) and those on the left indicating fractions of a second. In etching the scale markings, the distance, in centimetres, from the apex of the triangle (measured along the vertical) to the scale markings is calculated as follows:

(1) *C.P.S.*: Distance =

$$\frac{\text{C.P.S. represented by 1/6 base (3)} \times \text{vertical height (10)}}{\text{C.P.S. on scale}} = \frac{30}{\text{C.P.S. on scale}}$$

(2) *Seconds*: Distance =

$$\frac{\text{Vertical height (10)} \times \text{seconds on scale}}{\text{Seconds represented by 1/6 base (1/3)}} = 30 \times \text{seconds on scale.}$$

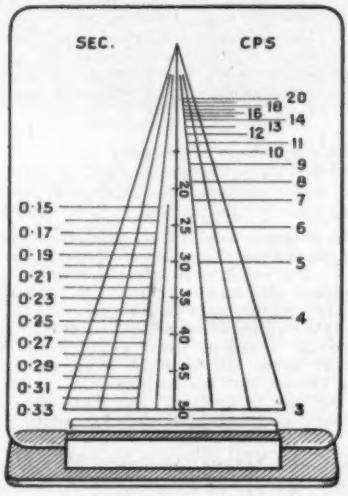
The vertical line is marked in centimetre divisions.

When the base of a wave is cut by the vertical and the line adjacent on the right, its frequency can be read from the C.P.S. scale on the right. Similarly, when the vertical and the line adjacent on the left are used, the duration of the wave or interval can be read on the seconds scale on the left. Should lines other than those immediately adjacent to the vertical be used, the figures representing C.P.S. and seconds are doubled or trebled. Alterations can also be readily made when the paper speed is halved or doubled.

When the sides of the triangle cut similar points in two cardiac cycles in the electrocardiogram, the cardiac rate is read on the C.P.S. scale and the number multiplied by ten. This is obvious when it is remembered that the base represents 2 seconds—i.e., 30 C.P.M.

The ruler can be used in such a way that the vertical line of the triangle lies along the base of a series of waves. The ruler is then moved to the right or left until one of the lines above the vertical cuts the apex of the wave to be measured. The point on the vertical line where this occurs indicates the voltage of the wave depending on the calibration of the instrument (in the present case 1 cm. is equivalent to 50 μV).

It is an advantage to etch an additional line midway between the vertical and the line adjacent on the left because this allows intervals of short duration to be



measured. When this additional line is used, the numbers on the seconds scale are, of course, halved.

It is strongly recommended that the ruler when not in use should be supported on a base so that the perspex is not scratched.

Some tips for the amateur instrument maker are as follows:

(1) When the lines are etched with a ruler and needle, the sheet of perspex should be laid on a sheet of carbon paper.

(2) An angle-poise lamp enables the light to be directed at an angle most convenient for showing up the lines.

(3) When the lines are etched they should be rubbed with carbon paper, and the excess wax removed with a cloth. This makes the lines appear black against white paper.

(4) Vertical lines raised outside the limits of the ruler on the sheet of perspex avoid unnecessary and unsightly marks on the ruler itself.

(5) A vibrator tool is useful for etching the numbers. The numbers, of course, must be printed in reverse because the etched surface of the perspex ultimately forms the under surface of the ruler.

Voltage markings on the vertical, in multiples of 5 for convenience, can be calculated as follows:

$$\frac{\text{Distance, in cm., from the apex to the voltage marking} = (\text{mV or } \mu\text{V on scale marking} \times 30.)}{(\text{Distance moved by paper in 1 sec.}) \times (\text{mV or } \mu\text{V equiv. to 1 cm.})}$$

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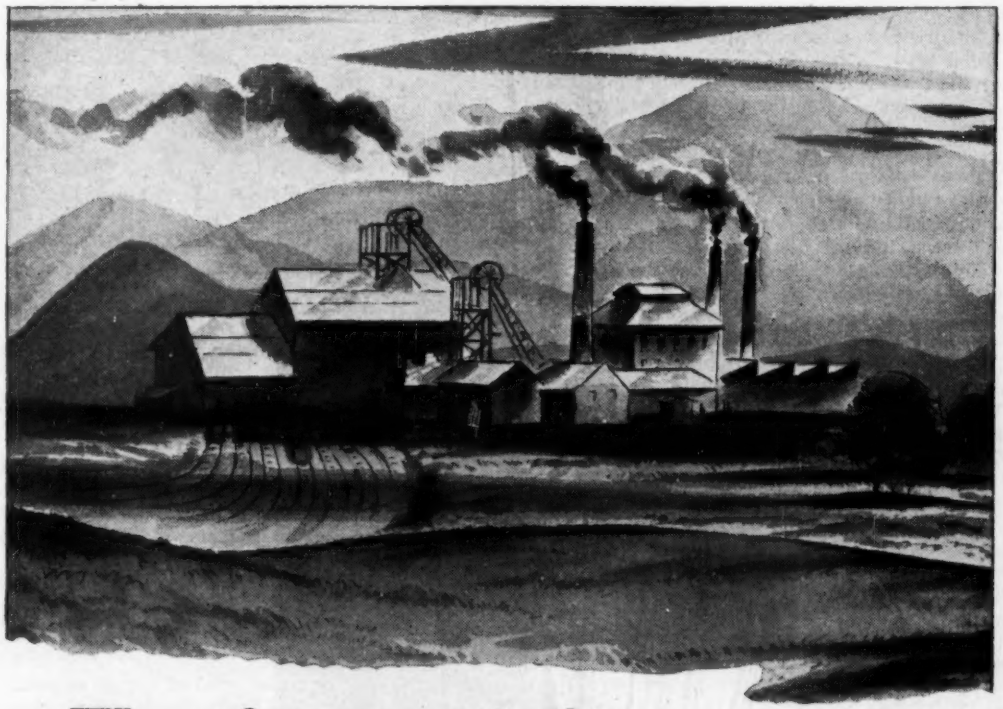
Glasgow



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THE LANCET
LONDON: SATURDAY, JUNE 4, 1955

Society and the Criminal

"... a crime should never be divorced from the background or setting in which it occurs: if it is, then the situation is prejudiced and judgment becomes distorted."

IN saying this, in the course of his Morison lecture to the Royal College of Physicians of Edinburgh last year [1] Sir DAVID HENDERSON was drawing a close and interesting parallel between the clinical manifestations of nervous and mental illness, and the behaviour and thought disorders indicating abnormality and crime.

"They stem," he said, "from the same sources, they start early, they are psychobiologically determined, are characterised by clinical manifestations which are closely akin, are susceptible to similar methods of investigation and are most successfully treated at a preventive level."

Moreover, as he pointed out in an earlier passage, the responses of society to them are much alike. For centuries it was customary to treat brutally patients suffering from acute recoverable forms of mental disorder: "their incurability was manufactured." In a like manner, crime has always stirred us to retaliate: "The cry for revenge is hearty and spontaneous." Insanity still evokes in many people a revulsion not explicable at the conscious level; and the aggression evoked by crime has similar obscure origins. It is as though these things were infectious, breeding in us irrational and antisocial responses which we are not immediately able to recognise for what they are. Perhaps it would be truer to say that they rouse uneasy recollections of the same forces in ourselves, forces held, perhaps precariously, in check; and our automatic defence takes the form of cruelty: we would strike down the messenger who brings us evil tidings of our inner selves.

The ætiology of criminal behaviour, like that of mental illness, he believes, is complex and cannot be pinned down to a single cause such as environmental stress. It must include not only parental attachments but constitutional factors—hereditary, developmental, endocrine, and metabolic. Separation from the mother in the early years may indeed be one such factor, but can hardly be the only one: in fact criminal behaviour, he suggests, is not a symptom but a reaction-type—"a social reaction-type if you prefer it, but still a psychobiological reaction dependent on our particular make-up, however it may have been forged." This might seem to hark back to LOMBROSO, were it not that Sir DAVID allows as much weight to environment as to constitution, and has moreover a humane concern for the criminal as a person. He sees him as dominated ("like every other individual") by emotional storms and distorted ideas which may stem from his unconscious life, "and which under certain circumstances may be completely uncontrollable." He notes, too, that delinquency, like mental instability, often manifests itself for the first time at puberty; and he mentions how closely some older criminals resemble paranoiacs in that, starting from wrong premises, they build up a more or less logical argument which is as unshakeable as the systematised delusions of paranoia.

Many such people have come under his observation, for since 1921 his psychiatric opinion has been sought on criminals whose nervous or mental stability was suspect at trial. Before 1932 the cases sent to him were nearly always of murder or attempted murder; but since then all manner of behaviour disorders have been referred—cases of theft, housebreaking, sex offences, fire-raising, and others. He takes this change to indicate a growing alliance between the law and medicine which in time may lead to a better-behaved society. He classifies 477 cases referred to him under names given of old to three of the seven deadly sins: lust (150 cases), malice (171 cases), and greed (156 cases). The 150 criminals convicted of crimes of lust ranged in age from 12 to 80 years, and came from all walks of life. They included 4 cases of bestiality, 8 of sodomy, 8 of incest, 5 of rape, 5 of obscene letter-writing, 33 of homosexual conduct, and 87 of lewd conduct. The striking thing about this group as a whole—more astonishing to laymen, however, than to doctors—is the high proportion of the criminals who were of normal mentality as assessed by intelligence tests: only 12% were diagnosed as insane, 17% as mentally defective, and 17% as psychopathic; while over half (54%) were "sane" in the sense in which the public and the law use the term.

The distribution of the sane (in this sense) in the six subgroups is interesting. Thus, of the 4 guilty of bestiality none could be classed as sane, whereas of the 8 guilty of sodomy all could: "but that is not to say," Sir DAVID comments, "that they were not strange, abnormal individuals who were driven by strong instinctive impulses and desires which became overmastering." Of the 8 people guilty of incest, 6 ranked as sane, and 4 out of 5 of those guilty of rape could be so classed; whereas 5 writers of obscene letters were all suffering from paranoid states.

All 33 of the homosexuals fell into the "sane" group. Nearly all of them were of high professional standing—schoolmasters, clergy, Civil Servants, bankers, lawyers, and the like. Many said they would not change their emotional inversion, even if they could, but a few were desperately anxious for help.

Sir DAVID comments regretfully on the inconsistency of the sentences passed on homosexuals, which ranged from one to three years' imprisonment. Where medical treatment seemed likely to be of use, the judge often said that whatever medical treatment was needed would be given in prison. The effect of imprisonment, of course, is to confine the homosexual for long periods to the society of his own sex, and perhaps to confirm him in his inversion. Sir DAVID did not make this criticism, though doubtless he had it in mind. He holds, as do most doctors nowadays, that homosexual tendencies most probably depend on a failure to develop and mature, the patient remaining fixed at a homosexual level. Our aim, he suggests, must be to gain the confidence of the legal profession and persuade them to accept this concept. This is not easy to do, he points out, in view of our

1. Society and Criminal Conduct. Edinburgh: The Royal College of Physicians. 1955. Pp. 44.

lack of success in the treatment of homosexuality; but he might perhaps have drawn the analogy of a leg which ceases to grow: people neither blame the doctor because he cannot always start the growth process off again, nor abuse the patient for having a limp.

The 87 lewd-conduct cases formed the largest subgroup under the heading of lust, and varied from exhibitionism to interference with young children. Only 29 of them were intellectually normal: 11 of them were insane, 22 mentally defective, and 26 psychopathic. Their oft-repeated offences were often precipitated by alcohol.

Sir DAVID remarks on the incurability of these cases, whether treated in a mental hospital or a prison; and on the difficulty of reconciling legal and medical opinion on them. Here again we are dealing with a developmental disaster—with people who have reached neither emotional nor instinctual maturity, even though they may "wear the mask of sanity." Sometimes they detest their aberrations as violently as anyone else (as seems to have been the case with the prisoner recently sentenced for assaulting two policewomen [2]): the criminal who is aware of a disorder in himself which society does not recognise as such is not uncommon, and must suffer greatly. The 171 crimes of malice included murder, attempted murder, assault, child neglect, threatening letters, and fire-raising. Sir DAVID found 43% of these criminals insane, and 13% mentally defective or psychopathic (as against only 12% insane and 34% defective or psychopathic among those convicted of crimes of lust).

Murder is often the solitary crime of a person who otherwise has had a good record, and where there are mitigating circumstances the convicted murderer is often reprieved, and usually makes a satisfactory social adjustment, never committing another offence.

The 156 crimes of greed included 122 of theft and 34 of fraud. As with crimes of malice, more than half the criminals were insane (33%) or mentally defective (16%) or psychopathic (6%) persons. Among those guilty of fraud were some criminals of ability who combined a paranoid personality with an obsessive need to show off; and these, he found, were the most difficult to influence of all criminal types.

Abnormality and unsoundness of mind, Sir DAVID HENDERSON argues, cannot be accepted as synonymous; for many criminals are abnormal in that they have failed to fit into ordinary social life, without showing any "unsoundness of mind" which could be certified as such according to existing definitions. In this opinion he differs, as he points out, from NORWOOD EAST and HUBERT, who believed that "the normal group of offenders constituted at least 80% of the receptions." He is well aware that the criminals he classes as abnormal, whether sick or not, may be a danger to society, and he recommends that in all cases of serious crime, when the accused's life-history shows evidence of malignant trends, detention should be indeterminate—as it is with certified mental patients. Discharge should depend on the attainment of social responsibility. This is an extension of the idea of the indeterminate sentence now being tried in Denmark and of the indefinite sentence which is on trial here. Finally he urges the great need for more intensive investigation of character traits, so that we may in time be able to distinguish their diagnostic and prognostic significance. Forensic psychiatry would then be in a position to point to particular clinical and psychobiological reactions, whether dependent on genes or derived from the environment. Such research might also put our profession in a stronger position to convince the lawyers of a concept now generally accepted by doctors—namely, that a person can at one and the same time be intellectually mature and emotionally and instinctually immature: that the "sound mind" cannot, in fact, be measured in terms of intellectual performance alone.

2. *Times*, May 10, 1955.

Valvotomy for Pulmonary Stenosis

THE results of valvotomy for simple pulmonary stenosis are extremely encouraging. CAMPBELL and BROCK [1] review 58 cases treated in this way at Guy's Hospital, London. 25 of these patients were cyanosed at rest, and a further 7 were thought to become cyanosed with exercise. The sex-distribution was almost equal. The majority were between the ages of 5 and 29, but 5 were over 30; and 3 cyanosed children were operated on at 4 years of age. Of the 8 deaths associated with the operation 5 were in the first 6 cases; since then there have been 3 deaths in 52 cases. Cyanosis betokens increased risk; of the 8 deaths only 1 was of a patient who was not cyanosed. As CAMPBELL and BROCK remark, in cases where cyanosis has appeared the best time for operation has been passed. The 50 survivors have been followed for two or more years (the longest for six) and none has died. Only 4 patients were not improved. In nearly all of the remainder improvement was considerable; for example, a cyanosed woman gave birth to a child eleven months after valvotomy and can now walk as far as she pleases, whereas previously she was limited to a hundred yards. In the cyanotic group improved colour and exercise tolerance were observed clinically; but only half of the acyanotic patients showed any disability, and improvement had often to be judged by objective methods alone. CAMPBELL [2] suggests that, in the absence of symptoms, the clearest indications for valvotomy are cardiac enlargement, electrocardiographic evidence of right ventricular strain, and a right ventricular pressure of 100 or more mm. Hg. In the series reported by CAMPBELL and BROCK the heart size, measured radiographically, decreased or remained stationary after operation in nearly all patients with enlarged hearts; but in those with small hearts the size commonly increased a little, apparently owing to their greater physical activity. In 3 patients the heart enlarged still further, and in 2 of these the clinical result was poor. The electrocardiogram improved in 26 of the 31 cases in which there had been evidence of right ventricular strain. Inversion of the T wave in leads V_{1-5} disappeared or decreased considerably; the changes usually began about six months after operation and continued for up to three years. The 5 patients in whom the electrocardiograms showed no change included 3 who did not improve clinically, but the remaining 2 have so far done well. Cardiac catheterisation was repeated in 24 patients after operation; the right ventricular pressure had fallen to less than half the former figure in all, and to a third in some, and in many the pressure gradient

1. Campbell, M., Brock, R. *Brit. Heart J.* 1955, **17**, 229.
2. Campbell, M. *Ibid*, 1954, **16**, 273.

across the valve had diminished remarkably. Arterial-oxygen saturation was invariably improved in cyanosed patients; in all but 2 the interatrial shunt was abolished, and the polycythæmia decreased accordingly.

This series is the largest yet described in detail. HOSIER et al.,[3] whose results seem very similar, have reported 89 cases in summary. BLOUNT et al.[4] have described a small series of 15, in 5 of which valvotomy was done through the pulmonary artery under hypothermia. In these 5 patients the right ventricular pressure was reduced to normal, but pulmonary regurgitation developed in at least 4. This has always been feared as a hazard of pulmonary valvotomy; but it was observed only 3 times by CAMPBELL and BROCK, and in only 1 patient was it serious. While it may seem disappointing that after operation the right ventricular pressure does not fall to normal, CAMPBELL and BROCK feel that it is preferable for the surgeon to leave behind mild stenosis than to produce severe regurgitation by attempting too much. So far no patient with a good result has begun to deteriorate again; but only further observation will show how long the improvement lasts. The operative risk is not large, and the mortality is likely to be reduced by submitting patients to valvotomy as soon as the need becomes apparent.

Annotations

ULCER-CANCER OF THE STOMACH

IN his Macewen lecture Prof. Matthew Stewart has once more raised the topic of ulcer-cancer in the stomach.[5] Examination of 1516 specimens removed surgically showed a combination of chronic simple ulcer with carcinoma in 103, and coexistence of the two lesions in a further 13. Simple ulcer was present in 935 cases. This might suggest that the proportion of simple ulcers which become cancerous is about 10%; but, as Stewart observes, many gastric ulcers heal spontaneously, so in fact the ratio must be lower. For other reasons, too, it is difficult to assess the incidence of ulcer-cancer. Gastric carcinoma is more commonly situated in the pyloric region than on the lesser curve, in the ratio of about 3 to 1; whereas for simple gastric ulcer the ratio is reversed. Since patients with a simple prepyloric ulcer are liable to come to operation earlier, owing to earlier complications, than those with a similar lesion on the lesser curve, the material from surgical specimens can hardly be regarded as a random sample. Similarly with cancer pyloric lesions are diagnosed earlier and operated on earlier; the fact that cancer of the body is more often removable, and is therefore more likely to provide specimens, adds a bias in the opposite direction, but it is unlikely that these two considerations neutralise one another.

Beattie and Moroney[6] approached the problem statistically in an attempt to prove that in the stomach an association between simple ulceration and cancer does exist; but, because of errors of sampling in existing evidence, they were unable to do so. Ivy,[7] approaching the problem experimentally, has examined the possible action on gastric mucosa of carcinogens—overheated fats, certain food dyes, and methylcholanthrene. He concludes that water-soluble agents may incite malignant change directly, but those insoluble in water can produce malignant degeneration only in the presence of a chronic ulcer or gastritis, since secretion of mucus and epithelial desquamation protect the mucosa adequately. This work indicates possible explanations of ulcer-cancer but provides no proof.

3. Hosier, D. M., Pitts, J. L., Taussig, H. B. *World Congr. Cardiol.* Washington, 1954, p. 382.
4. Blount, S. G. jun., McCord, H. C., Mueller, H., Swan, H. *Circulation*, 1954, **10**, 161.
5. Ulcer-Cancer of the Stomach. By MATTHEW J. STEWART, C.B.E., M.D., LL.D., F.R.C.P., F.R.F.P.S. Glasgow: Jackson, for the University. 1955. Pp. 31. 5s.
6. Beattie, A. D., Moroney, M. J. *Brit. J. Cancer*, 1952, **6**, 215.
7. Ivy, A. C. *Gastroenterology*, 1955, **28**, 345.

STANDARDISATION OF WOUND TEXTILES

MOST wound dressings are applied to protect the injured surface from contamination and to absorb exudate. For these purposes gauze and, if the secretions are copious, cotton-wool are commonly used. Baron[1] has compared in laboratory animals the mortality and the rate of wound healing with different dressings. Where the wound was superficial, healing was more rapid if the raw surface was exposed to the air. With deeper wounds, dressings produced better results. Absorption of secretions varied considerably with different types of textiles. When absorption was poor the secretions spread beneath the dressing, infection occurred, and the mortality increased. With thicker dressings and a more closely woven fibre, improved absorption was associated with poor central evaporation, and the persistently wet dressing resulted in wet, infected wounds.

Ideally fabric for wound dressing should not adhere to the tissues. At present, the only non-adherent materials are impregnated in a way which destroys their powers of absorption. The fabric should be close woven, and should not swell greatly on wetting or shrink on drying—changes which greatly retard wound healing. The finishing of the textile is important; matting with titanium oxide and brightening with optical whiteners are often the cause of wound irritation.

TREPONEMAL AGGLUTINATION TEST

THE immobilisation test for *Treponema pallidum* (T.P.I. test) is at present the only practical specific test for the serodiagnosis of syphilis.[2] This test is technically difficult, and considerable experience is required to read the reaction correctly. The technical difficulties include the need to avoid using sensitised spirochætal antigens, the deterioration of the survival medium used, the toxic action on the living treponemes of some sera, and the anticomplementary action of other sera which may invalidate the test. In addition, there is always the danger that laboratory workers may be infected by the living organisms. These difficulties can be largely overcome by the creation of special units; but this is expensive, and it draws away from general laboratories workers who can often ill be spared. Accordingly this test has been restricted to a few specialised laboratories.

For many years investigators have attempted to evolve a simple specific agglutination reaction. In 1953 McLeod and Magnuson[3] described their experiences with a treponemal agglutination (T.P.A.) test. *T. pallidum* killed either by the antiformin method of Tani by heat or by oxophenarsine hydrochloride yielded satisfactory antigens. On the other hand, formalin-killed *T. pallidum* did not agglutinate in the presence of syphilitic serum, while phenol-killed organisms showed some spontaneous agglutination. McLeod and Magnuson found that the addition of fresh steer serum accelerated and enhanced agglutination, and that the reaction was complete after two hours' incubation at 37°C. They concluded that the results of this test compared favourably with those of the T.P.I. test both in specificity and sensitivity.

1. Baron, H. *Nature, Lond.* 1955, **175**, 760.
2. See *Lancet*, 1954, **ii**, 1165.
3. McLeod, C., Magnuson, H. J. *Publ. Hlth Rep., Wash.* 1953, **68**, 747.

Hardy and Nell [4] have lately reported their work on agglutination of *T. pallidum* by sera from rabbits and human beings with treponemal infections. Unlike McLeod and Magnuson they do not employ steer serum. The technique is simple but requires eighteen hours' incubation at 37°C after mixing the antigen and serum. Hardy and Nell conclude that the natural treponemal infections of rabbits and the close immunological relationship of these infections to syphilis might explain the spontaneous clumping of the organisms in suspensions of *T. pallidum*. They also suggest that the more superficially placed antigen of *T. pallidum* reacts with Wassermann reagin, whereas the deeper somatic antigen reacts with the specific treponemal serum agglutinin. If this is so, the specificity of the standard tests for syphilis (S.T.S.) will have to be re-examined. These workers use heat in the preparation of their antigen, but as a further precaution the sera to be examined are absorbed by S.T.S. antigen before the agglutination test is done. In addition they use ethylene-diamine-tetracetate to overcome the inhibitory action of a divalent cation which is normally present in human serum. They conclude, as a result of testing 430 human sera, that this relatively simple test has a specificity comparable to that of the T.P.I. test and considerably greater than that of the S.T.S.

Dardoni [5] tested the technique of McLeod and Magnuson and concluded that, because of auto-agglutination of the organisms in the suspension of *T. pallidum*, it could not yet take the place of the T.P.I. test. Price and Boxall,[6] in this country, after a preliminary investigation of the technique of Hardy and Nell suggest that more research is required before it can be used routinely. Nevertheless, it would seem that this type of test holds great promise.

TUBERCULOUS PLEURISY

THORACIC surgeons have provided pathologists with material for studying almost all stages of pulmonary tuberculosis from the primary complex to the chronic cavity. Good use has been made of the opportunity, as is evident from Medlar's [7] detailed monograph. Lately pathologists have also been examining specimens from patients with tuberculous pleural effusions.

Stead et al.[8] describe 24 cases in which the chest was explored within a few months of the beginning of symptoms. All the patients were thought to have tuberculous effusions, and tubercle bacilli had been recovered from half of them. Thoracotomy was done because there were features in each case that "did not completely conform to the usual clinical picture." In fact, half were found to have non-tuberculous effusions, although in 3 of these acid-fast bacilli had been reported in sputum or pleural fluid. 15 were tuberculous, and the pleural sacs were removed with varying amounts of lung tissue. In 12 there was a caseous lesion in the lung just beneath the diseased pleura. In almost all of these 15 the pleura itself was more than 1 cm. thick and contained pockets of liquid caseous material. In 7 all segments of the lung had many small nodules which were not apparent in the preoperative radiographs. The clinical results are said to have been excellent in 12 of the 15; in 2 the decortication was inadequate, and in 1 staphylococcal empyema developed.

Stead et al. emphasise that it is not their policy to explore all cases of "idiopathic" pleural effusion. They state that 10 of the 24 patients were operated on to remove the residual thick pleura; and their description of the removed pleura might certainly suggest that this tuberculous tissue was better out than in. But none of the patients had been observed for longer than thirteen months after onset of symptoms; and it is well known that the pleura has astonishing powers of healing, and that all but a few patients without demonstrable lung lesions will remain well. Wynn-Williams and Shaw [9] found a five-year relapse-rate of 15% in 128 patients, only 14 of whom were given antibacterial treatment; and Emerson [10] observed no relapse in 17 patients treated with antibacterial drugs and followed for two years.

Not all would agree that the risk is so small. In this country the five-year relapse-rate was long supposed to be about 30%. But Roper and Waring [11] have recently reported reactivation of tuberculous disease in no less than 92 (65%) of 141 young men in the five years after a pleural effusion had developed while they were serving in the U.S. Armed Forces. It is generally agreed that pleural effusions in young adults are almost always tuberculous and very seldom, if ever, "idiopathic"; and that whatever may be the extent of the risk the condition should not be treated lightly. But it is very doubtful whether surgical extirpation can play a useful part.

OCULAR OCHRONOSIS

IN 1948 Anderson[12] first reported a new ocular syndrome in industrial workers engaged in the manufacture of hydroquinone. Miller [13] has described in detail a small group of cases in this country. In this syndrome the cornea and conjunctiva are stained in the area of the palpebral fissure. The cornea has a brown sepia-like stain which traverses the whole thickness of its substance and in severe cases may seriously impede vision. There are other changes which interfere with accurate vision—namely, vertical folds in Descemet's membrane, a white precipitate within the corneal substance due to protein denaturation, deformation of the anterior surface of the cornea producing irregular astigmatism, and in some cases ulceration. In the early stages the conjunctival changes consist in drying and thickening in the palpebral fissure, and this area later becomes yellow. Finally discrete dark patches develop over the white of the eye in the palpebral fissure on either side of the cornea, separated from it by a clear area. Once the corneal staining has appeared, there is likely to be permanent visual disability; this is not alleviated by contact lenses, but might conceivably be reduced by corneal grafting. The conjunctival staining gradually disappears without ill effect.

There seems little doubt that the main cause of this syndrome is lengthy exposure to the vapour and dust of quinone—an intermediate product in the manufacture of hydroquinone. Where the eye is protected by goggles or where the process is enclosed, the ocular changes do not arise. There is some slight evidence that long-continued exposure to an atmosphere heavily polluted with hydroquinone dust may produce corneal ulceration if the worker is unhygienic and careless in his protective habits; but some men have worked for twenty years in such an atmosphere without any change appearing. As far as is known, there has never been an instance of this syndrome in workers who handle hydroquinone during photographic development.

The clinical picture of this syndrome is of theoretical interest because it is almost identical with that of alkaptonuria and carbolic poisoning. The ætiological link is the staining of the eye either exogenously or endogenously by a salt of hydroquinone. For this reason the three conditions have been grouped together under the name

4. Hardy, P. H. jun., Nell, E. E. *J. exp. Med.* 1955, **101**, 367.
5. Dardoni, L. *Riv. Ist. sieroter. ital.* 1954, **29**, 440.
6. Price, I. N. O., Boxall, B. B. Personal communication.
7. Medlar, E. M. *Amer. Rev. Tuberc.* 1955, **71**, no. 3, part 2. See *Lancet*, May 21, 1955, p. 1063.
8. Stead, W. W., Eichenholz, A., Stauss, H. *Amer. Rev. Tuberc.* 1955, **71**, 473.
9. Wynn-Williams, N., Shaw, J. B. *Tubercle*, 1955, **36**, 74.
10. Emerson, P. A. *Quart. J. Med.* 1955, **24**, 61.
11. Roper, W. H., Waring, J. J. *Amer. Rev. Tuberc.* 1955, **71**, 616.
12. Anderson, B. *Arch. Ophthal., Chicago*, 1948, **38**, 812.
13. Miller, S. J. H. *Trans. Ophthal. Soc. U.K.* 1954, **74**, 349.

ochronosis—a word coined by Virchow,[14] who first described the pathological findings in alkaptonuria and wished to distinguish the disorder from melanosis.

THE CAUSE OF POSTURAL PROTEINURIA

A FEW weeks ago we said that the mechanism of postural proteinuria was still unknown.[15] An important contribution has since been made by Greiner and Henry.[16] These workers criticise the view[17] that the proteinuria is directly due to increased pressure in the inferior vena cava and renal veins, and refer to an experimental study[18] in which increase of caval pressure to 150–220 mm. saline, maintained for thirty minutes, caused no proteinuria.

Carefully controlled observations in six young men with postural proteinuria indicated that the most important ætiological factor is pooling of blood in the extremities. Advantage was taken of the fact that postural proteinuria is particularly liable to occur in hot conditions,[17] and all the observations were made at a temperature of 122°F. Lordosis in the supine position produced proteinuria once only, whereas venous-occlusion cuffs applied at a pressure of 80 mm. Hg to all four limbs resulted in proteinuria in all the subjects. Proteinuria, which regularly occurred after tilting the subjects to a 70° head-up position, was prevented by compression of the legs, which effectively inhibited peripheral pooling of blood.

Greiner and Henry point out that their observations explain the facts that postural proteinuria is commoner in hot conditions producing peripheral vasodilatation, and in motionless standing[17] which is particularly liable to cause pooling of blood in the legs. They suggest that deviation of blood from the heart and lungs causes arterial vasoconstriction which is proportionately greater in the renal arterial system. The erect lordotic posture greatly reduces the renal plasma flow,[19] but this fall is no greater in cases of postural proteinuria than in non-proteinuric controls.

LUNG CANCER IN ASBESTOSIS

THE causes of cancer of the lung are probably mainly exogenous,[20] but each of the definitely known carcinogenic substances—e.g., ores in Schneeberg and Joachimstal mines, bichromates—accounts for only a minute proportion of all cases. Doll[21] now confirms suggestive evidence that lung cancer is an occupational hazard of asbestos workers. Examination of the cause of death in 105 persons who had been employed in one asbestos works showed that 18 had had lung cancer, associated in 15 cases with asbestosis. The mortality of 113 men who had worked for at least twenty years in places exposed to asbestos dust was compared with the mortality experience of the whole male population. There were 39 deaths in the first group, whereas 15·4 were expected: the excess was due to deaths from lung cancer (11, compared with 0·8 expected) and from other respiratory and cardiovascular diseases (22, compared with 7·6 expected). The average risk among men employed for twenty or more years has been of the order of ten times that experienced by the general population. This risk has become progressively less since the precautions introduced as a result of the Asbestos Industry Regulations, 1931, to prevent dust dissemination in the works became effective.

Gloyne[22] found in his series of 1205 specimens of lungs with dust diseases, including 121 of asbestosis, that the rates for primary neoplasm of the lung in male and female asbestos workers were 20% and 10% respectively. Barnett[23] found 31 deaths with carcinoma of lung in 235 deaths associated with asbestosis during the years 1924–46, with a distribution of 17·2% male and 8·4% female deaths. Adjustments for length of exposure to the dust and age at death would scarcely account for the discrepancy in the figures between the two sexes. The same discrepancy exists in the figures for all cases of carcinoma of the lung: Kennaway and Kennaway[24] showed that the rates of female to male deaths in England and Wales had changed from 1 : 1·9 in 1921 to 1 : 4·0 in 1945; between 1935 and 1945 the increase was 256% for males and 176% for females. If the causes of cancer in the lung are the same for both sexes (as in asbestosis and possibly in smoking), can the sex discrepancy be related to the baffling fact that, while the total "amount" of tumour in both sexes is approximately equal, 40% of the cancer deaths in females are from carcinoma of organs peculiar to the female,[25] leaving correspondingly smaller numbers for other sites? If so, what internal factor determines this organ selectivity?

Unlike asbestosis, the main causes of dust diseases in the lungs are not associated with an increase in carcinoma of the lungs; and Kennaway and Kennaway[26] showed that bronchial carcinoma is less common in coal-workers than in the general population. James[27] has confirmed this very neatly by comparing a series of South Wales coalminers with a series of non-miners in the same area, obtaining figures of 3·3% for the former and 5·4% for the latter; but he points out that the relatively low incidence of tumour in the miners may be partly due to dust disease causing death before the average cancer age. The dust diseases generally act on the connective tissues, and there is no satisfactory explanation of why the asbestos fibres should affect the epithelium as well.

EPILEPSY AND THE ELECTRO-ENCEPHALOGRAM

IMPROVED techniques of electro-encephalography (E.E.G.) have confirmed some earlier correlations of electrical with clinical activity, such as that of bilateral 3-per-second wave-and-spike patterns with petit mal; have led to the modification of some, such as that of square-topped waves and a sharp down peak with psychomotor epilepsy; and have cast renewed doubt on others, such as the identification of the cortical spike focus with the site of origin of an epileptic discharge.[28]

Gibbs and his colleagues[29 30] have described valuable information about the natural history of E.E.G. abnormalities which has important clinical implications. By following changes in E.E.G. patterns as infants and children develop, they have obtained a "longitudinal section" of electrical brain activity to supplement the brief "cross-sectional" view of isolated E.E.G. recordings. They point out that the immature brain tends to react to various possibly epileptogenic traumata with a generalised electrical abnormality. Moreover the pattern of reaction differs at different stages of maturation. In infancy "hypsarhythmia" (continuous slow-wave high-voltage discharge with diffuse spiking) is common;

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as the first decade of life is traversed, at first "petit-mal variant" (2-per-second sharp-and-slow waves) and then "classical petit mal" (3-per-second wave-and-spike activity) are more usual. In adolescence and adult life the electrical response to cerebral insult becomes more localised. This is so with epileptogenic factors occurring ab initio at this age, and may also apply to activity shown earlier as a generalised response in childhood. Focal activity, though less common, does also occur in childhood, and, unlike the generalised response, it may clear spontaneously or change in form and site as age advances. Thus occipital foci, present rather more often in the 1–5 age-group, had tended by the age of 9 either to disappear (40%) or to change their location (37%) to a temporal or possibly subcortical site; while midtemporal foci, by the age of 15, had either cleared (54%) or migrated to an anterior temporal or subcortical site (38%).

Gibbs and his school have done a great deal to advance the clinical value of electro-encephalography, and these studies put us further in their debt. The evidence that some focal abnormalities disappear spontaneously with age will be welcome to all those dealing with epilepsy in childhood. It confirms clinical observation and underlines the need for caution in excising "epileptic foci," especially in the young. Moreover, the change in focus once more raises the question of whether the primary site of epileptic discharge is cortical. Gibbs et al. speak of "migrating foci," which is a vivid description; but the change may be due to altered activity in one part of a complex neuronal circuit allowing activity already present in another part to emerge more clearly. We still know too little of what the E.E.G. pattern represents in terms of cellular neurophysiology.

This work has further value in posing many clinical questions. We are not told what proportion of those with focal and general E.E.G. abnormalities had focal or general fits; nor is it clear, apart from the statement that "many develop multiple foci," what happens as age advances to the varying forms of generalised abnormality found in childhood. Finally we need to find out the proportion of children who show these abnormalities but have no clinical attacks at all.

GALL-BLADDER AND HEART-BLOCK

CONFLICTING views are held on the relations between the gall-bladder and the heart. These fall under three headings—namely, the differential diagnosis between angina pectoris and the pain of gall-bladder disease, the coincidence of gall-bladder disease and coronary-artery disease in the same patient, and the possibility that gall-bladder disease may aggravate existing heart-disease.

White and his co-workers [1] reported clear evidence of disease of the gall-bladder in 6·8% of 1000 patients, who presented clinically with coronary-artery disease. They found at necropsy that disease of the gall-bladder was almost twice as common in patients with severe coronary-artery disease as in those with normal coronary arteries. This association, they suggested, was related to an ageing process. Breyfogle,[2] on the other hand, concluded from a comparable necropsy study that the association between gall-bladder disease and coronary-artery disease was independent of age and sex. Wolferth [3] wondered whether the two diseases shared a similar metabolic pathogenesis. But there is a striking difference in the sex-distribution of coronary-artery disease, with male preponderance, which has not been found in disease of the gall-bladder.

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Whether gall-bladder disease aggravates angina pectoris is still uncertain, but there is now clear evidence that it influences arrhythmias. McLemore and Levine [4] report 7 cases of heart-block and gall-stones; recent biliary symptoms had been present in all. They concluded that the heart-block was due to coronary-artery disease or hypertension in 5; in 1 it was possibly congenital, and in the 7th it might have been due to diphtheria in childhood. 5 had complete heart-block with frequent Stokes-Adams attacks; 1 had first-degree heart-block with sinus pauses and syncopal episodes; and the 7th had an episode of transient complete heart-block accompanied by an upset of consciousness. Preventive measures had failed adequately to relieve these attacks. All these patients underwent cholecystectomy. 4 were strikingly improved, with no subsequent attacks of loss of consciousness for six months or longer; preoperatively these 4 patients had experienced such attacks very frequently—up to four times a day. The remaining patients were also improved, with definite diminution in the frequency of the attacks. Anæsthesia was not thought to have contributed to their improvement. Asystole during operation called for special measures in 3 of the patients, but all withstood operation well. McLemore and Levine reasonably conclude that in patients with Stokes-Adams attacks, and especially where these have persisted despite treatment, disease of the gall-bladder should be sought.

The physiological basis of cholecystectomy in heart-block is not completely clear. McLemore and Levine's clinical observation is supported by experiments on the frog,[5] and comparable but inconclusive observations have been made experimentally in man.[6] Swallowing has been found to precipitate Stokes-Adams attacks; Weiss and Ferris [7] recorded three cases in which Stokes-Adams attacks were brought on in this way, and suggested that they were due to a vagal reflex. In 1 of their patients a traction diverticulum of the œsophagus was present. Distension of the diverticulum by a rubber balloon led to auriculoventricular dissociation and syncope. Release of the distension was followed by a return to normal sinus rhythm and the disappearance of symptoms. Atropine abolished the symptoms and the heart-block. Mackenzie [8] found in a patient with rheumatic carditis that either digitalis or swallowing delayed auriculo-ventricular conduction. But it is still difficult to define the precise action of the vagus and the sympathetic nerves on the heart in the intact animal.[9]

Another drug has been added to those that may be useful in the medical treatment of heart-block—namely, sodium lactate. Bellet et al.[10] have found sodium lactate of value in resuscitating the heart after cardiac arrest, in treating ventricular standstill in Stokes-Adams attacks, and in otherwise increasing the ventricular rate in complete heart-block. The drug was given by intravenous injection or infusion.

These two promising new methods of treating heart-block will no doubt be widely tested. Both may prove more commonly effective than the artificial pacemaker.[11]

We regret to record the death of Dr. C. W. BUCKLEY, who was senior physician to the Devonshire Hospital for Rheumatic Diseases, Buxton, and of Dr. ROBERT FREW, formerly physician to the Hospital for Sick Children, Great Ormond Street.

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Special Articles

CALORIES AND CRICKET

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DESPITE the international prestige attached to success in sport, detailed physiological studies of the energy expenditure in team games are few. Although the calorie cost of baseball (Morehouse and Miller 1953), and even that of the eightsome reel (Passmore et al. 1952), are available, no detailed study of the energy expenditure in cricket could be found in the literature.

In a recent study of the energy expenditure of young men engaged in their usual activities, the problem of the calorie cost of games assumed some importance (Edholm, Fletcher, McCance, and Widdowson 1955). Opportunity was taken to measure oxygen consumption during archery, tennis, squash, and batting and bowling at the nets, and to observe and time events in an inter-college

TABLE I—ANALYSIS OF TIME SPENT BATTING AND FIELDING IN INTER-COLLEGE MATCH

Activity	Time spent (to nearest ½ min.)			
	Player 1		Player 2	
	Batting	Fielding	Batting	Fielding
Lying	..	..	..	½
Standing	1½	14½	8½	4½
Facing bowling	3½	..	6	..
Strolling	..	4½	..	18½
Walking	3	15½	2½	6
Running	1	½	1½	½
Total	9	35	18½	30

competitive cricket match of rather better than village-green standard.

COLLEGE CRICKET

In the college game, the mean scoring rate was 2·44 runs per over, and the average time per over was 3 minutes 27 seconds. In table I an analysis is given of the way in which time was spent by two players during the match. The term "facing the bowling" describes the time when the batsman is receiving the bowling and includes all stroke play. The time spent during fielding in picking up and throwing the ball was very short and is grouped with running.

The calorie cost of batting and bowling at the nets was measured with the subjects wearing a mask connected to a Kofranyi Michaelis portable calorimeter. Balls were delivered at the same rate as during play, and batsmen ran twice for each six balls bowled. The results for 4 subjects are given in table II.

The energy expenditure during play was calculated by analysing the time spent in the various component activities and multiplying these times by the experimentally determined energy expenditure for that activity. In calculating the calorie cost of bowling in the game the value for bowling at the nets was not used, because at the nets there was more than one bowler and hence a slower individual bowling rate. In addition, bowlers at the nets usually do more fielding than during actual matches. The results of such calculations are shown in table III. It appears that activity at the nets was comparable with tennis, while during play the calorie costs did not exceed that of walking.

TABLE II—ENERGY EXPENDED DURING NET PRACTICE

Player	Surface area (sq. m.)	Measured expenditure (kcal. per hr.)	
		Batting	Bowling
1	1·86	413·4	549·0
2	1·87	361·2	402·0
3	2·08	591·6	421·2
4	2·14	553·2	547·8
Mean expenditure (kcal. per sq. m. per hr.)		239·6	242·2

Although cricket is nothing like so energetic a game as football, the calorie values given in table III appeared

TABLE III—ENERGY EXPENDED DURING INTER-COLLEGE MATCH

Player	Surface area (sq. m.)	Computed expenditure (kcal. per hr.)		
		Batting	Bowling	Fielding
1	1·86	325·8	319·2	186·6
2	1·87	315·0	283·2	229·8
3	2·08	415·8	318·6	268·2
4	2·14	405·6	338·4	201·6
Mean expenditure (kcal. per sq. m. per hr.) ..		183·3	158·6	111·6

to be surprisingly low. On the other hand, great variety is to be expected in the tempo of our national sport and in the skill of the participants and consequently in the energy expended. These results might very well not be representative of cricket in general, and it was thought worthwhile to calculate the energy expended in Test cricket to see whether similar or different results were obtained.

TEST CRICKET

During the 1953 Test series against Australia, English summer weather accounted for 46 out of the 150 hours scheduled for play. For a further 4 hours the ball was out of play, leaving 100 hours during which runs were scored at the rate of 2·38 per over. The mean time of an over was 3 minutes 17 seconds, the daily average ranged from 2 minutes 50 seconds to 3 minutes 49 seconds. Further details are given in table IV. The original data from which these figures have been calculated are given by Swanton (1953) and White (1954). The scoring rate

TABLE IV—1953 TEST SERIES ENGLAND V. AUSTRALIA

Batting		Bowling		Fielding	
Total runs	4363	Total overs	1833	Total balls	11,026
From boundaries	1988	Overs per day	83	Boundary strokes	491
Extras	202	Overs per hour	18·3	Balls not scored from	8781
Other runs	2173			Other balls	1754
Mean rate per hr.	43·6	Mean time per over	3 min. 17 sec.	Balls taken in field	8099†
Running between wickets per hr.	26·6*	Mean runs per over	2·38	Balls taken per fielder per hr.	8·1
		Mean overs per bowler per day	12		

* Including running for byes and before boundaries signalled.
† Assuming ½ × 8781 balls taken by wicket-keeper.

per over and the average duration of an over are seen to be virtually identical for inter-college and Test cricket.

The figures given in table IV were used as the basis for calculating the calorie cost of fielding, bowling, and batting, although some assumptions were necessary—for example, that all running was at a speed of 7½ m.p.h. and walking at 4 m.p.h.

Individual performances during fielding could not be obtained from the records. The number of balls from which runs were scored is given in table IV. The number taken by the wicket-keeper is not recorded, but probably varies between a half and a third. It is assumed that the remainder must have been taken by the 9 fielders and the bowler, and this quantity was added to the number of scoring strokes, including boundaries, to give the total figure for balls taken in the field.

Fielding

Fortunately the hours of play in the five test matches totalled 100 hours, which simplifies some of the calculations. The fielding-rate for the individual is given by dividing the total number of balls taken (8099 assuming the wicket-keeper takes one third, or 6636 if he takes one half) by 100 (hours) and 10 (fielders), which gives a fielding-rate between 6·6 and 8·1 balls per hour. So a fielder will, on an average, take a ball once every seven to nine minutes, and since the infielders are most frequently involved, activity in the outfield must be slight.

Many fielders spend long periods slowly moving about close to their set positions, while others may stand firm but exhibit body movements of interesting variety. An allowance was made for the energy expenditure involved, by dividing the calculated standing-time, into strolling and standing, in the same ratio given in table I—i.e., standing : strolling = 19 : 23. The component activities of fielding were classified as standing (40·4% of the time), strolling (48·9%), running to field (1%) (assuming an average run of 20 yards to field each ball, which is probably an overestimate), walking after fielding, walking between positions (assumed to be 22 yards apart), and walking to and from the pavilion (a total of 9·7%).

The probable overestimate of time spent running is balanced by the lack of any allowance for picking up and throwing the ball. These figures are summarised in table V ; the computed mean expenditure for fielding is 50% greater than for standing alone and is equivalent to very slow walking.

Bowling

A run of 10 yards for all bowlers and a return walk of the same distance for each ball bowled was assumed in calculating the calorie cost of bowling (table V). Activities were classified as running up to bowl, walking back, walking to and from fielding position and pavilion, and standing fielding during alternate overs. The calorie costs of standing, walking, and running, as measured by Edholm et al. (1955), were used. The value for fielding is obtained from table V. An average of 83 overs was bowled each day, and the individual bowler delivered one seventh of these.

Batting

The figures given for batting in table IV show that there was running between the wickets for approximately half the runs scored. The over-all energy expenditure by batsmen (table V) was calculated from the measured costs for standing between overs, standing during batting of partner, batting, running, and walking to and from the pavilion. The duration of each phase was computed, assuming the walking was at 4 m.p.h. and the running was 22 yards per run at 7½ m.p.h. The final calculation summarised in table V gives the average calorie cost as 155·2 kcal. per sq. m. per hour.

A separate analysis of the energy expenditure of the wicket-keeper has not been made, as there is inadequate information available. Umpiring and scoring have also been neglected.

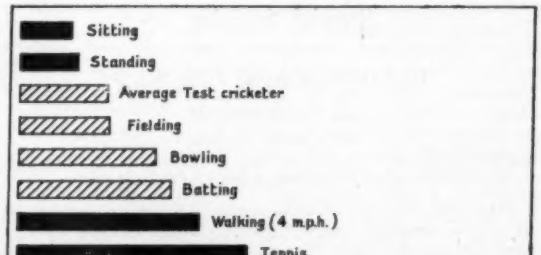
TEST PLAYERS

A final computation was made of the mean energy expenditure of that interesting but hypothetical individual, the average Test cricketer. This player indulges himself in all four components of the game—he bowls 4·2 overs, taking approximately 14 minutes, he bats for 38½ minutes and scores 14 runs, he rests in the pavilion for 116 minutes, and fields for the rest of the scheduled 6 hours of play per day. His energy expenditure is at the rate of 86·4 kcal. per sq. m. per hour—a value close to that of fielding. The accompanying figure shows how this expenditure compares with the computed expenditure of bowling, batting, and fielding in Test cricket, and with experimental values obtained from young men in other activities.

TABLE V—ENERGY EXPENDED IN 1953 TEST SERIES

Activity	Batting		Bowling		Fielding	
	Time (hr.)	Energy (kcal. per sq. m. per hour)	Time (hr.)	Energy (kcal. per sq. m. per hour)	Time (hr.)	Energy (kcal. per sq. m. per hour)
Standing ..	47·8	57·6	22·6	57·6	40·4	57·6
Strolling* ..	..	..	..	..	48·9	88·5
Walking† ..	6·7	181·2	23·0	181·2	9·7	181·2
Running‡ ..	4·4	386·4	8·2	386·4	1·0	386·4
Batting ..	41·1	239·6	..	..	..	..
Fielding ..	..	..	46·2	88·0	..	..
Total ..	100·0	..	100·0	..	100·0	..
Mean ..	..	155·2	..	127·0	..	88·0

* Equivalent to walking at 1–2 m.p.h.
† Including between overs and to and from the pavilion.
‡ Without additional allowance for throwing by fieldsmen.



Energy expenditure in young men (hatched = computed, black = measured).

It remains to study briefly the probable energy expenditure of individual batsmen and bowlers of both sides. In the course of the 1953 series the maximum personal score in a day was 101 not out by Hassett in the second Test. For the seven hours from the beginning of his innings it is estimated that the Australian captain expended energy at a rate 24% above the calculated mean, even assuming that he sat quietly while in the pavilion. The increase was due to a high rate of scoring and a high proportion of running between wickets. It was left to a Yorkshireman, Wardle, bowling very economically in terms of energy and runs, to achieve the maximum number of overs in a day. His analysis (36 overs, 14 maidens, 96 runs, 1 wicket) shows a high proportion of maiden overs, while his energy expenditure as computed was approximately 9% lower than the mean figure. This is due to a short run up to bowl and relatively rapid overs. According to the cricket correspondent of a London evening paper, Wardle took only 1 minute 48 seconds to deliver an eight-ball over in Australia recently, as compared with times of 2 minutes 52 seconds, 4 minutes 17 seconds, and 4 minutes 25 seconds for Appleyard, Statham, and Tyson respectively.

CONCLUSIONS

These calculations suggest that calorie expenditure in sport is inversely proportional to the duration of effort. They indicate that in cricket better exercise is obtained at the nets than in the field. The relatively small number of calories burnt by the average Test cricketer may have some significant connection with the small bulk of the Ashes.

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CONN'S SYNDROME

(Primary Aldosteronism)

FROM AN AMERICAN CORRESPONDENT

AT the recent meetings at Atlantic City of the American College of Physicians, the American Society for Clinical Investigation, and the Association of American Physicians much was heard of aldosterone (electrocortin) and of a new disease entity involving the adrenal gland, discovered by Dr. Jerome Conn, of Ann Arbor, Michigan. This discovery may be as important to medicine as Harvey Cushing's recognition of the syndrome which bears his name.

In a presidential address last October to the Central Society for Clinical Research, Dr. Conn described the case [1] of a 34-year-old housewife who was admitted to hospital on account of intermittent spasms, weakness, and paralysis of muscles. There were frequent attacks of great muscular weakness and other attacks of typical tetany involving the upper and sometimes the lower extremities. She was well between attacks, but the systolic blood-pressure was known to have been 180–190 mm. Hg for four years. For many years she had had polyuria and nocturia, and traces of protein were present in the urine. At the time of examination she was fit, save for positive Chvostek and Trousseau signs. The blood-pressure was 176/104; the size of the heart was normal; the reflexes were hyperactive; and no œdema was present. Biochemical studies revealed excessive amounts of aldosterone in the urine (equivalent to over 1500 μg. of deoxycortone acetate per day, compared with a normal upper limit of 115 μg. per day). There was severe hypokalæmia (serum-potassium fluctuating between 1·6 and 2·5 m.eq. per litre). The CO_2-combining power was increased, and the serum-sodium was slightly increased to 151. A renal tubular defect in reabsorption of water was found and was thought to be due to chronic hypokalæmia.

Dr. Conn pointed out the relative lack of important symptoms at extremely low levels of serum-potassium. He suggested that many cases of potassium-losing nephritis—such as that described by Evans and Milne [2]—were really cases of primary aldosteronism. At that time he prophesied that an aldosterone-containing adrenal tumour would be found when the patient was operated on, and he was right. At the April meeting of the American College of Physicians he showed coloured photographs of the large adrenal tumour which, on assay, was found to contain tremendous amounts of aldosterone compared with the aldosterone content of normal adrenal glands.

Last October Mader and Iseri [3] reported a case in which the clinical picture was very similar to that described by Conn. The patient was a 33-year-old woman with tetany, muscle pain, weakness, paræsthesia, hypertension, and nervousness. There was no history of vomiting, diarrhœa, or use of medicaments. The serum biochemistry was disturbed: K 1·60, Na 143, Mg 1·12, Ca 3·95, CO_2 43, Cl 84, P 1·6 m.eq. per litre; pH 7·5. Trousseau's sign was positive, even after intravenous calcium gluconate; but it gradually disappeared after prolonged treatment with potassium chloride. Detailed corticoid-excretion studies revealed high absolute values for 17-hydroxycorticoid derivatives consistent with hyperfunctioning adrenal cortex. Complete metabolic studies demonstrated: (1) failure of correction of hypopotassæmia with a daily intake of 50 m.eq. K; (2) pronounced negative Na balance and egress of Na out of cells during high K intake and balance; (3) a slightly negative magnesium balance on 12 m.eq. Mg per day; (4) loss of K in both urine and fæces; and (5) equilibrium of N balance. Infusion of saline caused a distinct fall in serum Mg and plasma K without increasing urine Mg or K. Profound electrocardiographic disturbance was only partly corrected by high intake of K. Mader and Iseri felt that the syndrome was most likely due to adrenal cortical hyperfunction.

Dr. Iseri [4] said that they had recently operated on their patient—some three months after Dr. Conn had had his patient operated on—and had found a large adrenal tumour which contained aldosterone. Iseri now knows of two other patients with the same syndrome who had adrenal tumours, and he has heard of a third patient in whom both adrenal glands were hypertrophied, the glomerular layer being particularly large. In this last case both adrenals were removed, and the patient recovered completely.

The symptoms in these cases, which are very similar to those previously described as "potassium-losing nephritis," seem to indicate that aldosterone primarily affects potassium metabolism, rather than sodium metabolism. But Dr. John Leutscher does not believe that this is true. The pathophysiology of the action of aldosterone was discussed at Atlantic City by Dr. Laragh and Dr. Stoerk and Dr. Leutscher. Laragh and Stoerk reported to the American Society for Clinical Investigation on the Mechanism of Secretion of the Sodium-Retaining Hormone (Aldosterone) within the Body. These investigators had previously demonstrated that administration of potassium can produce a rise in serum-sodium; that sodium-depleted subjects developed sustained hyperkalæmia after feeding relatively small amounts of potassium; and that hypertrophy of the rat adrenal zona glomerulosa correlated with the level of serum-potassium.

Their present study was designed to determine the effects of changes in sodium and potassium intake and blood concentration on aldosterone secretion. Synthetic diets were used in the study. They found that restriction of dietary sodium in man, even when combined with reduction in serum-sodium, produced slight to negligible aldosterone excretion unless potassium was provided in the diet. When potassium was given in excess, urinary aldosterone increased notably. They took these findings to indicate that potassium is a powerful direct or indirect stimulus to aldosterone secretion. Although dietary sodium restriction may exert its effect by modifying serum-potassium or Na/K relationships within body-water, the data best support the hypothesis that change in serum-potassium is a regulator—and possibly the primary regulator—of aldosterone activity.

Dr. Leutscher, of San Francisco, California, spoke at the meeting of the American College of Physicians, and reported that he had found high levels of aldosterone in cirrhosis, nephrosis, and congestive failure. The increased urinary output of hormone seemed to correlate well with the presence of œdema and was inversely related to sodium excretion. He also found that a high potassium intake lowered the urinary output of aldosterone.

1. *J. Lab. clin. Med.* 1955, **45**, 3.
2. Evans, B. M., Milne, M. D. *Brit. med. J.* 1954, ii, 1067.
3. Mader, I. J., Iseri, L. T. *J. Lab. clin. Med.* 1954, **44**, 895.
4. Personal communication.

THE MIDWIFE IN THE MATERNITY SERVICE

IN a memorandum on policy the Royal College of Midwives welcomes the provision, under the National Health Service Act, 1946, for maternity medical services to be given by general-practitioner obstetricians, and for the attendance of consultant obstetricians should the need arise, but expresses its belief that the maternity service must continue to be based on the provision of an adequate number of well-educated, well-trained, and experienced midwives. The midwife today is trained to be "the practitioner of normal midwifery," and as a member of the obstetric team she should be given a share in the planning and organisation of the service.

Antenatal Care

The College thinks it of vital importance for the midwife to continue to exercise her clinical skill during the antenatal period.

"Many doctors are now undertaking antenatal care in their own surgeries, but this does not absolve the domiciliary midwife from taking her full share of responsibility . . . In hospital practice where the obstetricians attend every antenatal clinic, we consider it essential that there should also be antenatal sessions conducted by midwives.

"The midwife has always been a teacher of individual mothers but today she is taking a much larger part in the antenatal teaching of groups of mothers . . . Classes for the mothers in antenatal clinics should be organised by the midwife in coöperation with other members of the health team. The midwife herself should give the teaching on the physiology of labour and the preparations for it, the use of inhalational analgesics, the preparations for the baby, and breast-feeding. Provided she has had the appropriate experience, the midwife may, and often does, give instruction on relaxation and antenatal exercises to small groups of mothers.

"In our opinion the assessment of the suitability of the home conditions for confinement should be made by the midwife in consultation, where necessary, with the patient's own doctor."

Care During Labour

Every mother, in the College's opinion, should be under the constant care of a midwife during the whole of her labour. Although a doctor may be present for part of the time, the midwife should continue to take full responsibility for the majority of normal deliveries. She can administer inhalational analgesics and, under the Dangerous Drugs Acts, she can give certain pain-relieving drugs. It is thus within her power, and it is her duty, to give the mother adequate relief from pain during labour.

Postnatal Care

During the postnatal period the mother and baby should if possible be looked after by the same midwifery team who cared for them throughout pregnancy and labour.

"We deplore the practice in some hospitals of sending the mother and baby home, or to other premises, within a few days of confinement, since this makes it impossible to give them continuity of care.

"The care of mothers and babies should remain the responsibility of midwives for at least 28 days. It is the duty of the midwife to encourage the mother to attend for a post-natal examination and to make the necessary appointment.

"We are strongly of the opinion that premature babies should be nursed by midwives."

Administration

The College favours the formation of area midwifery committees with a composition similar to that of the Standing Maternity and Midwifery Advisory Committee of the Central Health Services Council. In order to facilitate the smooth running of the maternity service, voluntary interchange of staff within the service should be encouraged. Further the college holds that in both institutional and domiciliary practice the control of midwifery staffs should be by experienced members of their own profession.

"All ad-hoc maternity hospitals and maternity units of general hospitals, where there are 50 or more beds, should have their own midwifery matrons. Where midwifery units are too small for the appointment of matrons, the superintendent midwife should have complete control of the unit and be held responsible for all technical and nursing care of the patients and the discipline and good management of the department. She should be recognised as the appropriate person, in consultation with the matron, to engage pupil-midwives and other midwifery staff. Arrangement of off-duty and holiday leave should also be her province.

"Midwifery staff in these units should not be interchangeable with the nursing staff of the general hospital to which the unit may be attached.

"The superintendent midwife should have direct access to the appropriate hospital committees when matters affecting the midwifery department are under discussion and she should make the reports on her own department."

Every local health authority should, in the College's opinion, appoint a non-medical supervisor of midwives who should be a State-certified midwife with the necessary experience. This officer should be responsible to an administrative medical officer and should have access to the appropriate committee when matters with which she is concerned are under discussion.

Recruitment of Midwives

There is today a grave shortage of midwives in some maternity hospitals and homes, particularly in those which are not training-schools. The need is not so much to attract more recruits into midwifery training as to retain the trained personnel in the practice of midwifery. The College lays emphasis on the following points:

(*a*) *Promotion.*—There should be greater scope for the promotion of midwives within the profession. More midwifery matrons should be appointed, so increasing the prospects of promotion and encouraging the midwife with administrative ability to remain in midwifery. Newly qualified midwives should be given opportunities to take their fair share of responsibility in order to equip themselves for promotion to more senior posts. "We believe that the midwife without additional qualifications should be considered for promotion on her merits as a midwife."

(*b*) *Auxiliary Staff.*—The provision of adequate auxiliary staff, nursing and domestic, in maternity hospitals and homes would allow trained staff to devote more time to their specific duties for the mother and baby, and would thus make the conditions of practice more attractive to midwives.

(*c*) *Salaries and Conditions of Service.*—It is most important that the heavy responsibility undertaken by the midwife and the irregular and long hours which she often has to work should be suitably recognised in her salary and conditions of service.

DOCTORS IN PARLIAMENT

IN last week's General Election ten doctors were elected to Parliament. Two of them are newcomers to the House of Commons—Dr. D. McI. Johnson, Conservative member for Carlisle, and Mr. J. D. Cronin, F.R.C.S., Labour member for Loughborough.

R. F. B. BENNETT, V.R.D., M.A., B.M. Oxfd, D.P.M. (C., Gosport and Fareham), was first elected in 1950.

A. D. D. BROUGHTON, M.A., M.B. Camb., D.P.H., D.P.M. (Lab., Batley and Morley), first entered Parliament by winning a by-election in 1949.

J. D. CRONIN, M.B. Lond., F.R.C.S. (Lab., Loughborough), qualified from St. Bartholomew's Hospital in 1939. He served in the R.A.M.C. from 1942 to 1946. After holding appointments at the Royal Free Hospital and Great Ormond Street, he became orthopædic surgeon to the French Hospital in London. He has been a member of the London County Council since 1952.

WALTER ELLIOT, P.C., C.H., M.C., M.B., D.SC. Glasg., LL.D., F.R.C.P., F.R.S. (C., Glasgow, Kelvingrove), first entered Parliament in 1918. He held office as Minister of Health in 1938–40. He has represented his present constituency since 1950.

SOMERVILLE HASTINGS, M.S. Lond., F.R.C.S. (Lab., Barking), a former chairman of the London County Council, was first elected in 1923.

CHARLES HILL, P.C., M.A., M.D. Camb., LL.D., D.P.H. (L. and C., Luton), was secretary of the British Medical Association from 1944 until he entered Parliament in 1950.

D. McI. JOHNSON, M.A., M.B. Camb. (C., Carlisle), qualified from St. Bartholomew's Hospital in 1926. He is also a barrister-at-law.

Colonel MALCOLM STODDART-SCOTT, O.B.E., M.D. Leeds (C., Ripon), was Conservative member for Pudsey and Otley from 1945 to 1950, since when he has represented Ripon.

BARNET STROSS, M.B., M.SC. Leeds (Lab., Stoke-on-Trent Central), has been in Parliament since 1945.

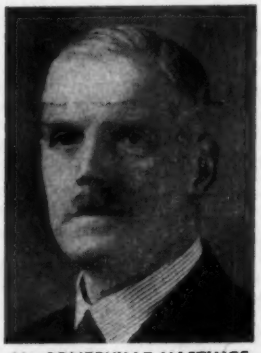
EDITH SUMMERSKILL, P.C., M.R.C.S. (Lab., Warrington), represented Fulham West from 1938 until the recent dissolution.

The photograph of Dr. Bennett is by the *Evening News* and *Hampshire Telegraph*; Mr. Cronin by Universal Pictorial Press and Agency; Dr. Hill by Elliot and Fry; Dr. Johnson by Lafayette; Colonel Stoddart-Scott by Navana; Dr. Stross by the *Daily Herald*; and the remainder by Press Portrait Bureau.

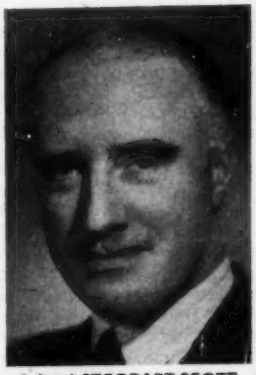
Dr. CHARLES HILL

Mr. WALTER ELLIOT

Dr. BARNET STROSS



Mr. SOMERVILLE HASTINGS



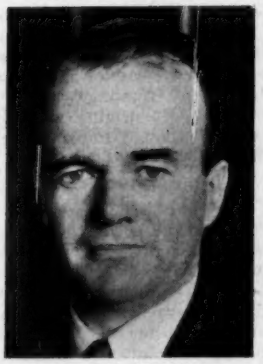
Colonel STODDART-SCOTT

Dr. R. F. B. BENNETT

Dr. EDITH SUMMERSKILL

Dr. D. McI. JOHNSON

Dr. A. D. D. BROUGHTON



Mr. J. D. CRONIN

A NEW CHILD-HEALTH CENTRE

Ex Natal, ante natal, post natal is the comprehensive motto suggested by Prof. Alan Moncrieff for the new Province of Natal Centre of the London University Institute of Child Health. The centre was opened on May 26 by Mr. G. P. Jooste, High Commissioner for the Union of South Africa, who said that the financial help given by the people of Natal, in founding it, was part of the "Salute to Britain Fund," which they collected as a gesture of sympathy for our war-time troubles.

PILGRIM'S PROGRESS

How the fund came to be used in this way is a stirring story. In 1939 the medical committee of the Hospital for Sick Children, Great Ormond Street, were already debating how the hospital might best collaborate with the preventive health services; and at the same time a committee at the British Postgraduate Medical School were discussing a plan for preventive pædiatrics. By 1943 (and considering how our attention was occupied at the time, this must be regarded as fairly rapid going) informal discussions had taken place with senior medical officers in the London County Council, and the phrases "model infant welfare centre" and "model school treatment centre" were heard. In 1946 the University of London Institute of Child Health, with Professor Moncrieff as director, was founded, and though it was tucked into the hospital, and using cubicles for offices, it began at once to investigate how a model welfare centre might come into being. The borough councils of Holborn and St. Pancras allowed the institute to use their centres for the teaching of preventive work; but money for building was scanty, and building prospects scantier. But in the summer of 1947 this star-crossed project suddenly found friends: Mr. Rupert Ellis, the Mayor of Durban, mentioned, in the course of a friendly visit to Professor Moncrieff, that he was sorry the advent of the National Health Service had prevented the people of Natal from helping Great Ormond Street Hospital. "I remember gripping my chair hard," Professor Moncrieff said at the opening ceremony, "as I launched into a tactful explanation of how the money could still be used—for our model welfare centre." The sequel was a message from Mr. Ellis to the South African Gift Committee; and on Dec. 4 news came that the institute was to have £106,888—the balance then remaining of the Natal Gift.

During the next eight years—years littered with planning committees, building committees, architects' conferences, and applications for building licences (finally issued in 1953)—the London County Council had time to consider their own part in the scheme, and undertook to pay 90% of the cost of maintenance and all the salaries of medical and nursing staff. By the time building actually began the original gift had increased to £120,000 by interest; though unfortunately the rise in building costs had kept pace.

MODEL INFANT-WELFARE CENTRE

The new building stands, on land provided by the university, at the corner of Guilford Street, overlooking another site benign to children—that of the old Foundling Hospital. In the long run it will house both the Province of Natal Centre and the Institute of Child Health, but so far only the centre has moved in. The spacious ground floor is planned for maternity and child-welfare work, with plenty of rooms for clinics (antenatal in the south wing, postnatal in the north), a waiting-room large enough to be used for demonstrations, lectures, and meetings, and a playroom for toddlers opening into what—when the builders relinquish it to the gardeners—should be a pleasant leafy garden with a fig-tree in the middle. This playroom, like almost every other room, and all the corridors, in the building, is heated from steam-warmed aluminium panelling in the ceiling—the steam being cleverly borrowed from the heating plant of the main hospital. A reinforced glass panel, reaching to the very floor, gives even the smallest child an outlook into the garden, and is guaranteed to stand up without splintering to thumps, kicks, and toy trains flung in anger. The playroom, with perhaps one or two others near it, is to be used as a crêche on two half-days a week, and if this proves a popular arrangement it may be extended. We all know the drawbacks of the full-time day-nursery, anyhow from the children's point of view; but a couple of afternoons a week in the company of other children is sometimes just what the pædiatrician prescribes for a child; and it can also provide a welcome break for his mother. Unfortunately such sporadic attendance is not usually acceptable to day-nurseries, and hence few mothers can arrange it for their children. The Province of Natal centre may be starting a new and useful pattern. The ground floor also houses a shop for welfare foods, and a demonstration kitchen. Just outside the entrance is a covered perambulator store, on which an eye can be kept from the inquiry desk, just inside.

MODEL SCHOOL TREATMENT CENTRE

On the first floor are rooms for those activities of the school health service which Professor Moncrieff described as "more conveniently carried out at a clinic than in the schools"—such things as dental and orthoptic rooms, a minor-ailments clinic, and a room specially equipped for the testing of deaf children. The child-guidance clinic which has been carried on at the John Street centre will also be transferred here to continue its work. On this floor, too, is the health visitors' room (there will be three of them and their superintendent) and also their common-room where they can lunch and brew tea. In addition, there are changing-rooms and lavatories for the children—boys at one end of the building, girls at the other, following the usual L.C.C. plan.

THE INSTITUTE

This floor will also contain the reference library of the institute, which is to occupy the third floor. The two large research laboratories are equipped with a new and practical type of bench, not built to the wall but fitted against it, with cupboards underneath which can be moved along on skids to any convenient position. The water-pipes to the sinks, and the gas-pipes, running along the wall behind the benches, are thus easily accessible to the engineers; and the layout of the laboratory can easily be altered by changing the position of the benches. On the landing outside is a cold room for storage of specimens.

All the windows in the building work on pivots at the mid-point of the two long sides: they can be turned completely over for cleaning, and adjusted at any angle for ventilation. The decorations are the only part of the new building which seem disappointing, being mainly in a timid shade of green; but no doubt gay curtains, some of which have already appeared, will make a great difference.

This is an important venture, a remarriage of therapy and prophylaxis—two partners who should have known better than to get divorced.

CENTRAL HEALTH SERVICES COUNCIL

THE thunder of the latest annual report by the Central Health Services Council[1] is rather distant; for accounts of the two main tasks completed during the year—investigations of general practice in the National Health Service,[2] and of the internal administration of hospitals[3]—were published some time ago.

1. Report of the Central Health Services Council for the year ended Dec. 31, 1954. H.M. Stationery Office. Pp. 26.
2. Report of the Committee on General Practice within the National Health Service. H.M. Stationery Office, 1954. See *Lancet*, 1954, ii, 32.
3. Report of the Committee on the Internal Administration of Hospitals. H.M. Stationery Office, 1954. See *Lancet*, 1954, ii, 741, 747.

Mental Nursing

During the year the council set up a working party to adjudicate on a difference of opinion between the Standing Mental Health Advisory Committee and the Standing Nursing Advisory Committee over nurses for mental and mental-deficiency hospitals. The working party unanimously favoured the training and employment of nursing assistants.

Shortage of Dentists

In 1946 the Teviot Committee reported that until about 20,000 dentists were in active practice there would be no likelihood of securing entrants more quickly than they were needed. The Standing Dental Advisory Committee saw no need to amend this appraisal. It found that of 15,000 dentists on the Register many were no longer in practice, some were practising outside the United Kingdom, and many admitted to the Register with Colonial qualifications were studying for higher degrees. Of the remainder who were practising some 40% were aged over 55. The committee concluded that "unless some action is taken there will be an acute shortage of dentists in the near future." The Minister of Health and the Secretary of State for Scotland have since set up an interdepartmental committee to ascertain the reasons for the lack of candidates of suitable quality and to indicate remedies.

GENERAL MEDICAL COUNCIL

SESSION MAY 24–27

THE General Medical Council met on May 24 and 25, and its session was followed by the sittings of the Medical Disciplinary Committee.

After a presidential address by Sir DAVID CAMPBELL (summarised in last week's issue) the council considered provisional proposals for abandoning the certificate in public health and consequent rearrangement of the curriculum for the diploma.

Dr. R. M. F. PICKEN, moving adoption of the report of a special committee set up last year, said that written and oral evidence had been obtained from interested bodies and persons. In general, the opinion was that no substantial amendment was required in the subject-matter prescribed in the existing rules, but it appeared that the provision whereby every candidate for the D.P.H. had first to obtain the certificate was serving no useful purpose and was proving inconvenient for teaching bodies. The rules were considered sufficiently elastic to enable any licensing body to make provision for part-time courses. The committee had drawn up draft rules abolishing the certificate and making consequential amendments. Candidates should have a fairly wide experience of clinical medicine before starting their studies for the diploma, and the proposed new rules laid down that a candidate should not be eligible to enter for the examination until two years after he had been fully registered. Dr. Picken explained that the net effect would be the same as with the existing rule, but persons who did not have to do a period of National Service would not be given an advantage.

The council agreed to circulate the draft rules, with an explanatory letter, to the licensing bodies and teaching institutions, and provisionally approved the draft introduction, subject to any necessary adjustment when the rules were submitted in due course for final approval.

Dr. H. GUY DAIN moved the adoption of the report of the Pharmacopœia Committee, containing the report of the British Pharmacopœia Commission. He pointed out that doctors would have eight years in which to get used to writing their prescriptions in the metric instead of the apothecaries' system. Sales of the *British Pharmacopœia 1953* to date totalled 33,728. The *Addendum, 1955*, would be published on Oct. 3 and would take effect on March 1, 1956.

On the second day of its session the council met in camera to consider various matters, including, it is understood, questions concerning the medical curriculum.

Medical Disciplinary Committee

The Medical Disciplinary Committee ordered three erasures from the Register. There were no applications for restoration following disciplinary erasure.

TESTIMONIALS

In the past when the committee has postponed judgment, the doctor concerned has been told to furnish the names of professional colleagues and other persons of standing who would "be willing to testify to their knowledge of your conduct during the interval." The form used at the present session differed by the addition of the word "confidentially." Whereas previously the testimonials have on occasion been read in open session, with the doctor present, this practice is no longer adopted by the committee—a change that was commented on several times at the sitting.

One counsel, Mr. J. L. E. Rees, at the conclusion of a case in which judgment had been postponed, said that, although it was appropriate that the testimonials should be confidential, there might be something in them which the committee would take against the doctor. He suggested that an abstract of such adverse references should be supplied; otherwise the defence would be at a disadvantage.

Mr. C. P. Harvey, the legal assessor, said that this would be possible. The question was whether it would be politic. He was sure the committee would consider the point.

In two cases in which he appeared, Mr. E. B. McLellan, counsel, offered to help the committee if there was any point in the testimonials on which he could assist. The Legal Assessor replied that the testimonials were given confidentially. They would lose a great deal of their value if they were given by people who knew that they were afterwards to be the subject of comment and argument by other people.

NO ERASURE

Herbert Albert Kenneth Rowland, registered as of The Vicarage, Cleator, Cumberland, B.M. Oxfd (1945), had had judgment against him postponed from July, 1954, for obtaining payment in respect of prescriptions improperly and dishonestly claimed to have been dispensed by him. He was not present; but Mr. McLellan, counsel, instructed by Messrs. Le Brasseur and Oakley, solicitors to the Medical Protection Society, said that a year ago, in order to rehabilitate himself, he obtained a medical post in the Transvaal. Mr. McLellan submitted that the practice of asking for testimonials was applied most easily when the doctor remained in general practice or in hospital work in this country. It was not so applicable when he went to another country. Dr. Rowland was in the difficulty that the only two doctors with whom he was in contact were doctors in a subordinate position to himself. The President announced that the committee judged Dr. Rowland to have been guilty of infamous conduct in a professional respect, but after careful consideration of the testimony to his conduct and what had been said on his behalf they had decided not to erase his name from the Register.

The Registrar was not directed to erase the name of *Moreen Catherine O'Brien*, registered as of Endfield, Woodhouse, Sheffield, M.B. Sheff. (1950), who was found guilty of infamous conduct in a professional respect in forging medical certificates for National Insurance purposes which purported to relate to herself. Judgment had been postponed for a year.

FURTHER POSTPONEMENT

Judgment had been postponed for a year in the case of *William Frank Cruickshank*, registered as of Westwood, Brechin, M.B. Glasg. (1935), who had been found to have been convicted of being drunk and disorderly and to have been guilty of failing to visit or treat patients, neglecting over a considerable period his duties as a medical practitioner under the National Health Service, and disregarding his personal responsibilities to patients. Dr. Cruickshank attended

but was not represented. The President told him that the committee was not satisfied that the testimony as to his conduct would warrant them discharging the case at the present time. A further postponement of a year was ordered, in his own interests.

ERASURES

The Registrar was directed to erase from the Register the name of *Robert Taylor Noel Simpson*, registered as of Wakering House, Great Wakering, Essex, M.B. Belf. (1942). This is subject to appeal to the Privy Council within twenty-eight days. Mr. McLellan, who appeared for Dr. Simpson, said that his state of mind was such that retention of his name on the Register could not be recommended.

Ebenezer Francis Thomas, registered as of Round House, High Street, Tullamore, Offaly, M.R.C.S. (1951), was charged with infamous conduct in abusing his professional relationship with a married woman, and with committing adultery with her, of which he had been found guilty by decree of the Divorce Court. He was found guilty of infamous conduct, and the Registrar was ordered to erase his name from the Register. This is subject to appeal within twenty-eight days.

FURTHER CONVICTION

In May, 1954, the committee decided to postpone judgment for a further period of a year in the case of *Patrick Aloysius Gallen*, registered as of 89, Grant Street, Glasgow, C.3, M.B. Glasg. (1929). He had had convictions in 1940, 1946, and 1952 for driving while under the influence of drink and for driving without due care and attention. Mr. Widgery said that there had been a further conviction against the doctor for assault. In view of testimony to Dr. Gallen's conduct, the committee did not direct the Registrar to erase his name from the Register.

ABUSE OF DRUGS

Thomas Leven, registered as of 2, Beech Avenue, Irvine, Ayrshire, L.R.C.P.E. (1945), had had judgment postponed for a year in May, 1953, after a convicton for obtaining morphine sulphate, contrary to the Dangerous Drugs Regulations. Judgment was further postponed in May, 1954, and November, 1954, in the light of medical reports. Dr. Leven now attended and told the committee that it was more than fifteen months since he had received his last withdrawal dose. In view of the testimony to his conduct, the committee did not erase Dr. Leven's name.

NAMES NOT ERASED

In view of favourable testimony, the Registrar was not directed to erase the name of *Graham George Robertson*, registered as of 22, North Ridge, Bedlington, Northumberland, M.B. Edin. (1934), against whom judgment had been postponed for a year after conviction for driving a motor-car while under the influence of drink and in a dangerous manner.

James Ross, registered as of 151, Park Grove, Barnsley, Yorkshire, M.B. Edin. (1943), had had judgment postponed for a year after conviction for a series of drug offences. In view of the testimony to his conduct, the committee did not direct the Registrar to erase his name.

The Registrar was not directed to erase the name of *Herbert Trevor Duke*, registered as of 7, Manchester Street, London, W.1, M.B. Lond. (1952), who appeared before the committee.

In view of favourable testimony as to his conduct, the name of *Robert John Gordon Williams*, registered as of Rockdale, Abersoch, Caernarvonshire, M.R.C.S. (1941), was not erased. Judgment had been postponed from July, 1954, after two convictions for driving a motor-vehicle when under the influence of drink.

FURTHER POSTPONEMENT

Ralph Martin Case, registered as of 71, Gillott Road, Edgbaston, Birmingham 16, M.R.C.S. (1934), M.B. Birm. (1934), appeared for postponed judgment. He had been convicted of unlawfully procuring dangerous drugs. The President announced that the committee had postponed judgment for a further year.

Patrick Joseph Conlin, registered as of c/o Barclays Bank Ltd., Dudley, Worcs., M.B. N.U.I. (1920), had been convicted of driving a car whilst under the influence of drink. The committee postponed judgment for a further year.

NAME ERASED

Francis Carminow Doble, registered as of 42–43, Dean Street, London, W.1, M.R.C.S. (1906), was charged with having been convicted at the Central Criminal Court on Nov. 16, 1954, of unlawfully using an instrument to procure a miscarriage, for which he was sentenced to twelve months' imprisonment. The Registrar was directed to erase from the Register the name of Francis Carminow Doble. He has twenty-eight days in which to appeal.

SHOOTING CHARGE

Robert Philip Strang, registered as of 40, Harley Street, London, W.1, M.R.C.S. (1940), M.R.C.P. (1946), had been sentenced to eighteen months' imprisonment at the Central Criminal Court in November for shooting Edward Anning with intent to do him grievous bodily harm. Judgment was postponed for two years.

DRUG OFFENCE

James McKenzie, registered as of 255, Rochdale Road, Middleton, Manchester, M.B. Aberd. (1944), admitted convictions in 1954 of unlawfully procuring amidone for himself and of unlawfully procuring a dangerous drug. The committee postponed judgment for two years, requiring Dr. McKenzie to give names of persons who would be prepared to testify confidentially as to his conduct in the meantime.

BREACH OF THE PEACE

Robert Lindsay, registered as of 8, St. Ninian Drive, Inverness, M.B. Glasg. (1945), admitted convictions for committing a breach of the peace in 1951, 1952, and 1955, and one of being found drunk in 1954. The President announced that judgment was postponed for a year.

MOTORING OFFENCES

William James, registered as of Richmond Villa, Llandyssul, Cardiganshire, M.R.C.S. (1942), was summoned on a charge of having been convicted at Carmarthen in 1953 and again in 1955 of being in charge of a motor-vehicle when under the influence of drink. The committee postponed judgment for a year.

Public Health

QUARANTINE MEASURES IN POLIOMYELITIS

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THERE has been much discussion about the possible value of quarantine measures in the prevention of poliomyelitis. Agerholm (1953) suggested that all persons with any degree of contact with a patient after the 4th day preceding the onset of symptoms should be strictly quarantined for 15 days. The expert committee on poliomyelitis of the World Health Organisation (1954) recommends that "Children with familial or intimate exposure should be confined to their homes for 21 days. Adults need not be confined. . . they should refrain from association with children other than their own and should avoid intimate contact with adults."

Apart from the question of the advisability of applying quarantine measures, the practicability of their application would depend on the distribution and spread of virus in the community. The measures might need to be applied to all infected persons if a significant limiting effect were to be obtained in the community. However, the view has been expressed that "infection moves through a relatively narrow stream of the population" (Bradley 1952), and it has been shown that virus can be isolated much more often from associates of cases than from non-contacts and with the greatest regularity among

household contacts (Brown et al. 1954). On the other hand, serological studies have shown the high frequency of subclinical infection. The work of Melnick and Ledinko (1953) showed that, at the time of a type-1 summer epidemic, the ratio of subclinical infections to clinical cases was as high as 175 to 1 in children aged less than 1 year and somewhat lower in older children. This suggests that virus is much more widely disseminated than is apparent from the number of clinical cases.

We describe here a small outbreak of poliomyelitis in a country district during January and February, 1954. Part of the affected area had been under regular survey since 1951. Quarantine was applied under relatively favourable conditions. Laboratory investigations were designed and applied to estimate the extent of infection with the virus in household contacts of cases, and in sections of the community at large, during and after the period of quarantine. The findings indicate that the quarantine measures applied in this community did not prevent the spread of infection.

Laboratory Methods

Examinations for virus were made by inoculating tissue-cultures with extracts of fæces or of sewage. All the specimens were frozen as soon after collection as possible and were transported and stored frozen till just before test.

Tissue-cultures.—Epithelial-cell cultures were grown in plasma-lined roller tubes from explants of minced monkey kidney in a medium consisting of 95% synthetic medium 199 (Morgan et al. 1950) and 5% horse serum. Cultures were ready for use after 8–10 days' incubation at 37°C. After the addition of either stool or sewage extracts cultures were re-fed as necessary, usually at 5-day intervals. The presence of poliomyelitis virus was suspected if cultures underwent characteristic cytopathic degeneration (Robbins et al. 1952), and was confirmed by neutralisation in tissue-cultures or by complement fixation (Le Bouvier et al. 1954) with type-specific hyperimmune monkey sera. Similar cultures and cultures of HeLa cells (Scherer et al. 1953) were used for antibody tests; fresh medium was added just before inoculation and was not changed subsequently.

Fæces.—10% aqueous suspensions of each specimen were centrifuged; and each supernatant fluid, to which antibiotics had been added, was inoculated into 2–4 cultures. Some of the specimens yielding negative results were re-tested after ten times concentration of the extract by ultracentrifugation for an hour at 40,000 r.p.m. in a 'Spinco' centrifuge.

Sewage.—To obtain samples, gauze swabs were left in the sewers for three days (MacCallum et al. 1952) at thirty points which had been selected in 1951 for a survey (MacCallum et al. 1953). Fluid squeezed out of the swabs was pooled and concentrated from about 1·5 litres to a final volume of 6 ml. by precipitation with ammonium sulphate followed by ultracentrifugation (Melnick 1947). Samples taken at individual points were treated individually by ultracentrifugation alone (Melnick 1947). Each sample was inoculated into 10–20 cultures, 0·1 ml. being used per culture.

Water.—100 ml. of each sample was centrifuged at 40,000 r.p.m. for an hour, and the entire deposit was inoculated into ten cultures.

Tests for antibody.—Sera from the cases and contacts were subjected to a neutralisation test in which mixtures of blood or serum dilutions and a standard dose of virus (100 TCD_{50}) were inoculated into tissue-cultures. From the school-children 0·1 or 0·2 ml. of whole blood was collected by ear prick and immediately diluted with 0·6 ml. of saline solution containing a trace of heparin. After sedimentation of the blood-cells the supernatant fluid was tested for neutralisation of type-1 poliomyelitis virus by inoculation into suspensions of HeLa cells. This modification of the technique has been found sensitive to traces of antibody, and was therefore valuable for tests on such small samples of blood.

Description of Area

Topography

The terrain is farming country in East Suffolk. The Town A, of about 7400 inhabitants, is surrounded by a rural district which includes several parishes of 50–400 inhabitants. The town, which lies on a main road and railway, has some industry and a market. It is served with piped water and drainage. On the sewage system thirty points established for the 1951 survey had been used for regular quarterly sampling. Each point received drainage from 9–100 houses. In the present investigation an additional point was selected receiving drainage from a few of these points and from other parts of the town, about 650 houses in all. No houses where cases of poliomyelitis had occurred nor any of the town's schools drained into these points. The sampling was estimated to have covered 1450 houses with 4430 inhabitants, more than half Town A's population.

Village B, of 96 inhabitants, obtains its water from various places and has no piped sewage. Most families from the village visit the town for shopping, to see the doctor, &c. Children aged more than 11 years attend secondary schools in the town, and children aged less than 11 years attend a primary school in the neighbouring parish: this school had 21 children under one teacher. Teaching was usually conducted in one room, and midday meals were served in a second room. Bucket closets were provided outside the buildings, but hands could be washed only in a small cloakroom inside the school and supplied with water pumped from a well apparently directly under the school-house. The contents of the latrine buckets were used to manure a plot of land 150 yards from the school. Drinking-water was brought in sterilised containers to the school from the town.

History of Poliomyelitis in the Area

Records over the past thirty years showed that single paralytic cases had been notified from Town A in each of the years 1925, 1948, and 1951. The rural district embracing Villages B and C had a less fortunate record for its total population of 19,280. In 1937 there was one case, in 1947 four cases, 1949 five, 1950 three, 1951 one, and in 1952 four cases, all paralytic.

We had been interested in this area since 1951. Virus was isolated from the case in the town in 1951 and found to belong to type 2 (Goffe 1953). Sewage had been examined at intervals of three months since the spring of 1951. In 1951 sewage sampled 10 days after the onset of the case was shown by monkey inoculation to contain poliomyelitis virus, but this was not typed. Virus was not isolated again until July and November, 1953, when on both occasions a type-2 poliomyelitis virus was found.

Present Outbreak

The order of events in 1954 was as follows:

Jan. 8: case 1, aged 3 years, from Town A, admitted to hospital with paralytic poliomyelitis.

Jan. 11: case 2, aged 33, from Village B, admitted to hospital with paralytic poliomyelitis.

Jan. 12: case 3, aged 11 years, from Village B, admitted to hospital with paralytic poliomyelitis.

Jan. 13: case 4, aged 16, from Town A, admitted to hospital with non-paralytic poliomyelitis. Conference to decide on quarantine measures.

Jan. 14: quarantine imposed on families of cases 1–4. Collection of specimens started. 8/17 household contacts found to be virus carriers.

Jan. 19–21: Virus found in sewage of parts of Town A, away from households of cases, and in sewage of household of case 4.

Feb. 4: 21st day of quarantine. 6/17 household contacts still virus carriers.

Feb. 12: onset of paralytic poliomyelitis in case 5, aged 29, in Village C.

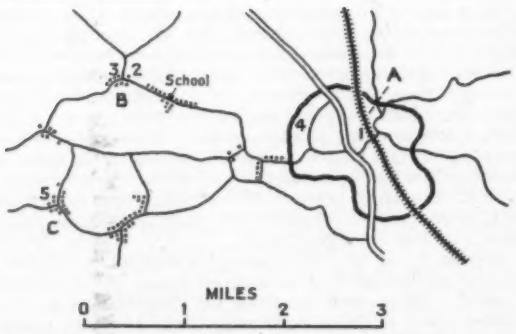
March 2: 5/17 household contacts still virus carriers. 1/18 school-children of Village B found to be a virus carrier.

March 8: quarantine lifted (54th day).

March 16–18: virus found in sewage of parts of Town A, away from households of cases.

April 7: 1/17 household contacts still a virus carrier (84th day).

It will be seen that during the second week of January, 1954, four patients with poliomyelitis were admitted to



Sketch map showing location of cases 1–5 and village school and relation of town to surrounding villages.

hospital, two from Town A and two from Village B. Three of these cases were paralytic and one non-paralytic; none of the patients became dangerously ill, but case 1 had considerable residual disability affecting both legs. In the middle of February another case came to light in Village C, a woman complaining of weakness in the arms only. Cases 1 and 4 came from different areas of the town, and had no known contact with each other directly or indirectly, or with members of the village families (see figure). Cases 2 and 3 were close neighbours in a group of council houses, obtaining a common water-supply from a deep bore-hole. Case 3 attended a school in the town; his brother and sister went to the same village school as a daughter of case 2.

On Jan. 13 a conference was held between the medical practitioners of the town, the medical officer of health, the sanitary inspectors of the urban and rural districts, the director of the Ipswich Public Health Laboratory, and ourselves to decide on quarantine and other precautions to be taken, and on the scope of the investigation. From the evening of the same day quarantine was applied to the families of these four patients. Restrictions on the children were maintained until March 8, a total of 54 days. In each of the four families children stayed away from school, had no contact with other children, and paid no visits to houses of other families or places of public congregation. Adults avoided contact with others as much as possible; fathers continued at their work, and mothers were allowed to go shopping, but in some instances this was done for them by neighbours, who left the goods on the doorstep. The only visits permitted to each house during the 54 days' quarantine were the periodic calls of the family doctor and the sanitary inspector in connection with the investigation.

Samples of fæces were collected weekly for seven weeks and later from those still found to be excreting virus at the end of this period. Blood samples were taken from the family of case 4 at the beginning, and from all the families at the end of the period. A sample of tap-water was collected from the house of case 1 on Jan. 13, and a sample from the deep bore-hole in Village B on Jan. 14. Sewage from parts of Town A was collected, as described above, on four occasions: Jan. 15, Feb. 16, March 16, and May 11. In addition sewage draining from the house of case 4 was sampled separately on each of these occasions. Five days before three quarantined contacts returned to the village school samples of fæces and blood were collected from them and from all the other school-children and the teacher; three weeks later a second series of specimens was collected.

Laboratory Findings

Examination of cases.—Type-1 poliomyelitis virus was isolated from one or more specimens of fæces from four out of five cases (cases 1, 3, 4, and 5). Case 2, from whom virus was not isolated, was a typical case of mild paralytic poliomyelitis in a woman aged 33. Six specimens of fæces all yielded negative results. However, she had type-1 neutralising antibody in her serum, and two of the four other members of her family were carrying this virus. We conclude that her attack was also due to type-1 poliomyelitis virus.

Examination of contacts.—Type-1 poliomyelitis virus was isolated from the first specimens collected from eight out of seventeen household contacts. None of these had any illness during the period of observation nor admitted to any symptoms suggesting minor illness during the preceding four weeks. Of those found negative at the first examination none subsequently became carriers. In three of the four families half or more of the household contacts were carriers; but in the family of case 3 specimens from all four members were consistently negative; moreover, one child in this family had no type-1 neutralising antibody in his serum. Evidence of intrafamilial spread of infection was therefore lacking in this family. Of all contacts from the four families there were eight children aged 1–10 years of whom six were virus carriers, and nine adults of whom only two were virus carriers.

Duration of excretion of virus in symptom-free carriers.—One of the eight symptom-free carriers, an adult, was found to be carrying virus on the first examination only; in the remaining seven excretion was more or less prolonged: one child excreted virus for 14 days, one adult for 31 days, four children for 48 days, and one child, aged 15 months, for 84 days.

Examination of sewage.—Type-1 poliomyelitis virus was found in sewage coming from parts of the town other than the houses of the cases, in the sampling both of Jan. 19–21 and of March 16–18. This indicates the presence in the town of infected persons outside the families of cases, both at the beginning of the quarantine period and after it was over. Virus was not found in the February and May samplings. Type-1 poliomyelitis virus was also isolated from the swabs left in the drain of the house of case 4 in January and February, at which times four out of six and five out of seven persons respectively in the household were excreting the virus.

Examination of school-children in Village B.—One out of the eighteen children at the village school was excreting type-1 poliomyelitis virus on March 2 but not on March 23, and thirteen out of the eighteen had type-1 neutralising antibody in their blood on both occasions. None of the three quarantined contacts was excreting virus at the time of his or her return to school.

Examination of water.—Virus was not isolated from the samples of piped water of Town A and water from the deep bore-hole in Village B.

Discussion

This outbreak was favourable for observing the effects of quarantine measures, since it occurred in the winter with a small and easily observable number of clinically apparent infections and only one type of poliomyelitis virus, type 1, was concerned.

Quarantine was applied to the families of the first four cases for 54 days, starting on the 5th day after notification of the first case and 12 days after the onset of the minor illness. The restrictive measures conformed in general to those recommended by the World Health Organisation (1954) and by the Ministry of Health (1954), but their application lasted more than twice as long.

In assessing the effects of quarantine measures it is important to take into account the fact that 47% of the household contacts were excreting virus when quarantine was applied. There is no way of knowing whether the paralytic or the subclinical infections occurred first; moreover the dating of the outbreak from the onset of diagnosed poliomyelitis ignores possible preceding subclinical infections elsewhere in the community. That this was in fact the case is suggested by the finding of

virus in sewage from other households in the community during the first week of quarantine, although type-1 virus had not been found at the sampling two months before the outbreak started. A week after the raising of quarantine restrictions virus was again found in the sewage away from the cases' households. The other community group outside of the cases' households that was studied was the school in Village B, where five days before quarantine ceased one child was carrying type-1 virus, and thirteen out of eighteen had serological evidence of infection at some time in the past with this virus. It seems probable that infection had been travelling silently round the school during the time of the quarantine restrictions. Further evidence of the wide distribution of the virus is given by the occurrence of the fifth case from Village C four weeks after quarantine was started. Thus, in spite of the restrictions on the contacts of the known cases, evidence was obtained of infection in the community during this period.

The findings in the household contacts of the cases are of interest. The proportion demonstrated to be infected with poliomyelitis virus in the fæces, 8/17 (47%), is closely similar to that (41%) which has been found during outbreaks in the United States studied mainly by Francis and his colleagues (Brown et al. 1954). The infection-rate was much higher in the children than in the adults, and the duration of excretion was longer in the children. Only one out of the four households did not show evidence of intrafamilial spread. In each of the families to show contact infection the youngest child showed the longest duration of excretion. The infant with its high susceptibility to infection, its liability to prolonged virus carriage, and its untrained bowel habits provides both a rich source of virus and a ready means of dissemination into the household environment.

The duration of excretion of virus by household contacts of cases of poliomyelitis does not appear to have been measured previously. There were eight symptom-free virus carriers in this group; seven were still excreting virus 14 days after the first examination, six after 21 days, five after 48 days, and one, aged 15 months, after 84 days. These durations of observed excretions probably do not represent the total period of virus carriage, which may well have started before observations were begun. Quarantine seems to be of doubtful value in practice if, at the end of three weeks, three-quarters of the infected members are to be returned to the community still carrying virus. Even when the period of quarantine was more than doubled, as for this study, more than half the carriers were still infective at its termination.

We conclude that the findings in the household contacts suggest that quarantine could not be an effective preventive measure in poliomyelitis, and that the community studies show that in this instance spread of infection took place despite them.

Summary

During a small outbreak of poliomyelitis in a country district in the winter months quarantine was applied to the households contacts of the first four cases for seven and half weeks.

Evidence from virological studies is presented showing that community infection took place despite the quarantine measures, and the virus was found in sewage draining houses in which no clinical cases of poliomyelitis had occurred.

Eight out of seventeen household contacts of clinical cases of poliomyelitis due to type-1 virus developed infection without symptoms. 21 days after virus was first found six out of eight, after 48 days five out of eight, and after 84 days one out of eight were still carrying virus.

It seems clear that, under the conditions observed, which were peculiarly favourable to the imposition of quarantine measures, infection was widely disseminated in the community, and must have been spread by other means than by the patients and their immediate contacts.

We are grateful to the family doctors, the sanitary inspectors of urban and rural districts, and the medical officer of health in the area concerned, as well as to the director of the Ipswich Public Health Laboratory, all of whose collaboration made this investigation possible; and to the Eli Lilly Fund, out of which the 'Spinco' centrifuge was purchased.

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Poliomyelitis Vaccination

IT is expected that mass immunisation of children against poliomyelitis in the United States will begin again shortly.[1] In a statement on May 24 Dr. Leonard A. Scheele, United States Surgeon General, said that "vaccine produced by all manufacturers has been proven to be safe except possibly the lots of Cutter vaccine." Later he said that he expected "Federal clearance for some vaccine" early this week. The six manufacturers licensed to produce the vaccine have agreed to the government's proposals about safety standards, with "more sensitive and more frequent" testing of the vaccine.

On May 27 the number of confirmed post-vaccination cases of poliomyelitis was 111.

Control of London's Health Services

At a meeting on May 25, London Executive Council unanimously resolved that to transfer control of personal health services operated by the county council back to the borough councils would not be in the best interests of the population and "in fact would be highly undesirable."

The executive council had been invited by the county council to consider a proposal that certain health services should be transferred or delegated to the Metropolitan borough councils. At its meeting the council had before it a report by the local medical committee, which also was unanimously opposed to such a change.

In its report the committee remarked that since 1948, when London County Council took over personal services from the boroughs, much administrational duplication had been done away with. The increased nursing staff now responsible for the whole of the child population had been integrated; and the service was being "run with the utmost efficiency." If responsibility were to be restored to the borough councils, the extent of some of the services would depend entirely on the local rate; and "those living in the poorer boroughs where the rates are highest would obviously suffer most." It had been suggested that responsibility for the home health service should be divided between the county council and the borough councils; but "we have in the past seen the chaotic position of delegated responsibility in the tuberculosis service." The committee observed that, though it was proposed that the borough councils should exclusively control the services transferred to them, liaison between the boroughs was to be arranged to the satisfaction of the county council; and this proposal was unworkable.

1. *New York Times*, May 25, 26, 27, and 28, 1955.

In England Now

A Running Commentary by Peripatetic Correspondents

IN our little town, local pride boasts of three claims to fame—its salubrious salts, its generous accommodation for the mentally afflicted, and its Derby. Up on the downs, the hygroscopic chemicals in the soil give the turf an invigorating springiness which seems to communicate itself to the race-goers; and for those with time for reflection there is always the magnificent view of the pinnacles of the great mental institutions. There is a theory, popularly held after a trying outpatient session, about the indifferent mental health enjoyed by a singularly large section of the local population. This claims that many ex-patients settle here and raise families, for even they are aware of the unique attributes of the district.

On Derby Day one receives the distinct impression that all three major industries combine to ensure its success. Red-hot tips issue forth like sparks from a furnace and many a credulous victim has cause for regret after the race. The afternoon's work necessarily ceases, and those with outpatient appointments are seized with a sudden, though temporary, zest for fresh air. Among inpatients, no-one is too ill to take an interest in the commentary; and preparations usually begin in the morning with a popular clamour for the famous salts, whose pharmacological effect is ideally calculated to relieve all concerned from distracting thoughts at an exciting moment later in the day.

This year proved no exception in that losses were many and winnings were few. An inevitable gloom descended on the wards, impoverished tendon reflexes and subnormal evening temperatures were common, and the prospect of a forthcoming election failed to lift the depression. The only optimism sprang from a few undesirable characters who presented themselves at the casualty door in the hope of a night's bath, board and lodging, and theirs was short-lived.

* * *

He was a welcome change from the succession of dreary souls with faces as long as their list of symptoms, and tempers as irritable as their colons; and my heart warmed to his cheery face and twinkling eye as he puffed in medical outpatients. My surgical colleagues had obviously felt the same way about him, for they hoped that we would relieve his bronchial spasm as successfully as they had his retention.

Having duly percussed and listened, I was about to prescribe an antispasmodic and an expectorant when it struck me that his G.P. might already be giving him something of the sort. To my question he replied that his doctor prescribed a medicine, three times a day; a small pill, twice a day; an inhalation, one a day; and a linctus for the night.

"And do they help you?" I asked, thwarted. "Oh, I don't ever take them," he replied. "But you won't write and tell him that will you? It might hurt his feelings. You see, he is a fine doctor, and I have great faith in him."

* * *

XYZ was a normal English village and I had settled down to a peaceful holiday locum, when, one sunny afternoon, the telephone rang.

"Hello. This is Dr. B—Dr. A is on holiday. Can I help you?"

"This is Miss C; Miss D, who keeps bees, has just had a nasty sting and seems to be having a general reaction this time. I have already given her 'Antistin' and I was wondering if I should give her calcium?"

Miss C and Miss D were unknown to me—I had not even been warned about them—and Miss C's pharmacological knowledge appalled me.

"Well, Miss C, I don't understand why you wish to give calcium?"

"She has a generalised pruritus, Dr."

The word "pruritus" tripping so easily off the tongue made me even more uneasy and so in retaliation I asked:

"But do you have a preparation of calcium that can be given parenterally? No. (Good lord, she understands that!) Well, I doubt very much whether the chemist here will have any either. Why don't you bring her round to the surgery and I'll see what I can do?"

Before their arrival I consulted the available vademecums and was a little more at ease when they appeared. Miss D was easily dealt with. She had a generalised urticaria. Her eyes were puffy and bleary and she was so obviously uncomfortable that I got down to giving her adrenaline subcutaneously. Miss C was the real problem. She was a slender middle-aged woman made mannish by closely cropped hair. Throughout, whilst thrusting her hands deep into the go-to-hell pockets of her jeans, she lectured me on the anti-histamines—never one of my strong points. At last, finding the going rather heavy, I asked her where she had learnt so much about these drugs.

"Just after the war, I became the keeper of the anthropoid ape section of the Munchausen zoo and, for a time, we had an allergic ape." Then as a wistful afterthought: "They're very like humans, you know!"

* * *

The car gently came to a halt about midway between York and Tadcaster. The time was 1 A.M.; the nearest all-night garage was in York. After some time I was joined by the driver of a heavy lorry who stopped to offer help as is the nature of his kind. His tank was nearly full of petrol, but the task of transference appeared to be insuperable. The problem clearly was one of syphonage, and, in a moment of inspiration, the means became clear. The attachment of the two rubber tubes of a stethoscope to opposite ends of one earpiece supplied a syphon of effective length. The transfer of two gallons of the precious fluid was quickly completed and my journey home resumed.

My stethoscope was described by the makers as a dual-purpose instrument, and this claim appears to be justified. Perhaps the story should be entitled The Effective Use of the Stethoscope in Modern Medical Practice.

* * *

Not "In England" and not all of it "Now." When I was a R.A.M.C. surgeon in Egypt in 1945 I had so persistent a pain in my left renal area that I had an X-ray done. This showed nothing abnormal. A few days later my wife wrote from Devonshire that there was a new X-ray machine in the practice where she worked as a radiographer and her colleagues had used her abdomen as the subject of its first trial. The excellent films obtained showed a large stone in her left kidney. After the removal of the stone our health remained good until some months ago when I began to suffer from lassitude, loss of concentration, insomnia, and an ache in the suboccipital region. This led to a keener interest in the merits of vitamin B, barbiturates, and dextro-amphetamine sulphate, but with scant improvement. My wife consulted a gynæcologist two days ago and her ovarian cyst is to be removed in a fortnight.

Should I be blamed for failing to recognise my symptoms earlier?

* * *

In our family the teaching of citizenship or civics is pursued opportunistically rather than by plan, our main theoretical principle being to satisfy the child's thirst for knowledge as it is manifested. A golden opportunity presented itself on Election Day while we swallowed a hasty breakfast in order to get to the polling station.

Our eight-year-old daughter courteously divided her attention about equally between her food and the unprepared talk we gave on the Constitution and the principles of democratic government by election. Our degree of success can be judged by her sole question:

"And what do you get if you guess right?"

* * *

Our hospital is taking its share in the road-safety crusade. Where the ambulance charioteers swing round the mortuary bend on the drive, we are to have a new notice—"DEAD SLOW."

* * *

Overheard outside the hospital after visiting-hour.

"I'm afraid he's in a bad way. He's got blood-pressure and high blood-pressure—so they can't do much for him. If they treat one it upsets the other."

Letters to the Editor

CIVIL SERVICE MEDICAL APPOINTMENTS

SIR,—My attention has been drawn to a letter, signed Toad Beneath the Harrow, in your issue of May 14. Your correspondent appears to be taking the Civil Service Commission to task for including, in their advertisements for medical-officer posts in the Civil Service, the phrase "promotion prospects."

These posts were in the basic grade, and there are at present 382 such posts. Above these are 133 posts in the more senior grades, which are normally filled by promotion. There is also provision for "special merit" promotion in their existing posts for medical officers whose qualifications and experience are exceptional.

The argument that promotion prospects disappear if senior posts are not standing vacant at the time of advertisement is, to say the least, unusual. It does not appear to be accepted by other employers.

Civil Service Commission, London, W.1. W. H. FISHER Secretary and Commissioner.

CANCER

SIR,—I read with interest and some amusement the ingenious argument against cancer education put forward by Dr. Hazel Baker in your issue of May 21. Since I did not suggest the operation or perform it on myself, I can only conclude that she advises all her patients to refuse an operation if there is any chance of cancer being present. Can pessimism concerning the disease go further?

The difficulty about her suggestion, that patients who do not understand their symptoms will report to their doctor at once, is the fact that so often they give themselves the wrong explanation, and in many types of cancer they delay six months or over a year, as is proved by statistics. It is only by cancer education and talking freely about cancer that man (or woman) will become "a less frightened and more reasonable animal."

Yorkshire Council of the British Empire Cancer Campaign. MALCOLM DONALDSON Director of Cancer Survey.

SIR,—May we, as psychiatrists, comment upon Mr. Donaldson's interesting article of May 7? It seems necessary to draw a distinction between true cancer phobia and "cancer apprehension," terms which we think should not be used synonymously. Educated and well-informed persons may suffer from irrational fears, and the true phobic patient will not be substantially influenced by reassurance or education; his basic problem is an emotional one with deep unconscious roots.

Whether education will bring the cancer-apprehensive patient to the doctor any earlier is an open question. Surveys in this field have, in fact, been carried out in America and there is evidence to suggest that educated and cancer-conscious people may delay considerably in seeking help in the case of suspicious symptoms and signs. In particular, Bacon et al.[1] found that of 40 women with breast carcinoma, 28 were deemed to have shown neglect in consulting their doctors. These women were not of inferior intellect and "the delay was particularly remarkable in that all had been reached by cancer education and had thought of cancer at once."

We have no ready means of advising the cancer-experts on how to bring the cancer-apprehensive patient earlier to medical consultation. We suspect, however, that delay in seeking help may not necessarily be evidence of ignorance or lack of information, though admittedly much needless fear does indeed exist about cancer. Delay in many cases may be indicative of the individual's emotional make-up and the way in which he handles the difficulties that arise in his life. The more mature and responsible the individual, the more readily and realistically will he face the situation, frightening though it may be.

In short, the problem is as much an emotional as an intellectual one.

Southern General Hospital, Glasgow. H. I. CLAPHAM A. BALFOUR SCLARE.

1. *Psychosom. Med.* 1952, **14**, 453.

LOW-LACTOSE MILK FOR CONGENITAL GALACTOSÆMIA

SIR,—The essential need in the treatment of congenital galactosæmia is the exclusion of lactose and galactose from the diet. For infants and children with this disease, the most important dietary requirement is a low-lactose milk preparation. In the treatment of cases in Great Britain, Bray et al.[1] have given 'Nutramigen'; but this is an American preparation and both dollars and a special import licence are required in order to obtain supplies. Cox and Pugh [2] prepared their own synthetic food, the casein of which contained 1% of lactose.

We wish to report our success in treating a child with galactosæmia with a low-lactose synthetic milk powder, and to recommend this food to others for the treatment of such children. Messrs. Trufood tell us that this special milk powder is not yet available through the ordinary trade channels, but that it can be supplied by them through hospitals.

The patient, a boy, was first admitted to the Birmingham Children's Hospital at three months of age. He was marasmic, weight 10 lb. 2 oz. (birth-weight 10 lb. 7 oz.), and he had an enlarged liver, jaundice, and impaired liver function. His urine contained 3·2 g. of galactose per 100 ml., and paper chromatography showed the presence of galactose only. A galactose-tolerance test was carried out after a feed containing 5 g. of galactose, with the following results: blood-galactose, fasting 10·5, two hours 189, seven hours 31·5 mg. per 100 ml.; urine-galactose, total 1·3 g. in a six-hour collection following the feed.

Until he was seven months old the child was treated with nutramigen and made good progress on this food. He was then given Trufood low-lactose milk and his progress has been maintained satisfactorily.

The principal nutriments in the low-lactose synthetic milk powder were casein (washed), glucose, maltose, dextrin, and coconut oil. The washed casein was first dissolved in a solution of mineral salts. After adding the fat and carbohydrate, the reaction was adjusted to neutrality and the preparation completed by homogenisation, pasteurisation, and spray-drying. The approximate percentage composition of the final powder was protein 22, fat 22, carbohydrate 51 (dextrin 22, maltose 19, glucose 10), salts and water 5.

In all, four different batches of synthetic food have now been given to our patient. The lactose content of the washed casein incorporated into two of these batches was 0·04% and 0·13% respectively, giving values of 9 and 28 mg. lactose per 100 g. final milk powder.

On the last occasion of testing (age fourteen months) after an 8 oz. (227 ml.) feed of the special Trufood milk containing 2·8 mg. lactose, blood-galactose levels were: fasting nil, forty-five min. 18, ninety min. nil mg. per 100 ml.; urine-galactose, fasting 11, one, two, and three hours nil, four hours 11 mg. per 100 ml. These results indicate that the small content of lactose in this milk preparation did not cause any accumulation of galactose in the blood, or lead to appreciable galactosuria.

The lactose contents of the washed casein preparations were determined by the method of Harding and Downs [3] in protein-free filtrates obtained by an application of the zinc hydroxide (Somogyi) procedure. Blood and urine galactose concentrations were determined by the same method,[3] as described by King [4] for blood, and applied to urine filtrates prepared by the lead carbonate purification procedure of Dittebrandt et al.[5]

1. Bray, P. T., Isaac, R. J., Watkins, A. G. *Arch. Dis. Childh.* 1952, **27**, 341.
2. Cox, P. J. N., Pugh, R. J. P. *Brit. med. J.* 1954, ii, 613.
3. Harding, V. J., Downs, C. E. *J. biol. Chem.* 1933, **101**, 487.
4. King, E. J. Micro-analysis in Medical Biochemistry. London, 1951; p. 25.
5. Dittebrandt, M., Tenney, M., West, E. S. *J. biol. Chem.* 1944, **152**, 395.

The child is now seventeen months old, weighs 27 lb. and continues to develop normally, both physically and mentally.

We are indebted to Messrs. Trufood for generously providing the powder for our patient.

H. B. SALT
CONSTANCE A. C. ROSS
J. W. GERRARD.

The Children's Hospital, Birmingham.

CARDIAC MASSAGE

SIR,—I have read with interest the article by Mr. Neri and Mr. Stevenson.[1] The authors have brought out the advantages of their approach, which consists of an abdominal incision with subsequent splitting of the xiphoid process and blunt dissection of the sternal origin of the diaphragm through the foramina of Morgagni or "Larrey's spaces." The left pleura is subsequently opened and the whole hand is introduced into the chest.

Although this may represent a "new approach" it differs little from the method used in 1902 by Porrier and even earlier by Mauclaire. Wexler and Bromberg in 1951 described what they felt was a "new approach," in which the same anatomical dissection was made. Subsequently Devine and Devine have introduced a somewhat similar technique. Bost in the early 1920s described a similar procedure for exposing the heart. In general, all of these approaches have similar disadvantages, which on occasion can be serious.

After reviewing the records of over 1730 cases of cardiac arrest which have been sent to us, and which are included in our cardiac arrest registry, my associates Dr. J. William Hinton and Dr. L. Corsan Reid and I have concluded that the thoracic approach for cardiac "massage" is the method of choice for the following reasons:

1. The transdiaphragmatic or other procedures initiated beneath the diaphragm, or other procedures initiated through the abdominal incision, do not display the heart directly as is possible with the thoracic approach. By direct display the heart's activity can be assessed more accurately. Ventricular fibrillation is not always recognisable by palpation, and therefore it would be more likely diagnosed by the direct approach.

2. In about 15–20% of all cases ventricular fibrillation is present. In such instances defibrillation is most reliably effected by the electrical defibrillator; and the thoracic exposure allows easy application of the electrodes.

3. Drugs can be accurately injected in order to avoid the coronary vessels, and can be instilled into the heart-chamber for which they are intended.

4. The pericardial sac may need to be opened and can be most easily approached through the thoracic route. By such an approach the phrenic nerve is less likely to be severed. We also believe that the proper closure of the pericardial sac is best accomplished through the thoracic approach.

5. Manual massage through the thoracotomy incision results in more adequate cardiac output, and there is less chance of subsequent irreversible cerebral damage. Clinical experience as well as repeated work on dogs has convinced us that proper massage should maintain a circulation only slightly below the normal level. All experiments of which we are aware indicate that massage initiated through an abdominal incision does not bring about as great an output as does manual compression of the heart through the thoracic approach.

6. It is often helpful to shunt additional blood to the brain and into the coronary circulation. By the thoracic route the aortic can be pinched off with the fingers or with a rubber-shod clamp just beyond the origin of the great vessels.

The thoracic approach should be no less rapid than any other. One need not be a thoracic surgeon to enter the intercostal space and expose the heart. Artificial respiration must be maintained regardless of which route is used. Neri and Stevenson describe their route as an avascular one, and it is quite possible that post-resuscitative bleeding would be somewhat less; but the superior deep epigastric vessels pass through the space described. In addition cardiac arrest often happens at times when aseptic technique cannot be followed; often one does not have time to put on gloves. (Cardiac arrest is essentially a 3–4-minute emergency with few survivals after cerebral anoxia has persisted for more than 4 minutes.) The approach described by Neri and Stevenson involves a risk of generalised peritonitis and also of empyema.

It appears that in this country the thoracic approach is now used almost universally. The survival-rates are apparently greater with this route; many large medical centres have reported survival-rates of 60–80%.

Department of Surgery, University of Missouri, Columbia, U.S.A. HUGH E. STEPHENSON, Jr.

1. Neri, L., Stevenson, D. L. *Lancet*, 1954, ii, 1207.

DRUGS IN THE TREATMENT OF DEPRESSION

SIR,—In your annotation of May 21 you draw attention to the large doses of methylamphetamine which I have reported,[1] greater than those often suggested. Sargant and Slater,[2] for instance, give the daily dose of amphetamine as up to 20 mg., adding that half the dose of methylamphetamine gives the same effect.

The maximum daily oral dose which I have used has varied considerably, whether given as a single dose or divided into three doses before 1 P.M. The table below shows the maximum daily dose given to every patient I have treated at the late Dr. Elizabeth Casson's Mount Pleasant Nursing Home. The effect of each dose has been recorded by day and night observation.

Daily dose (mg.)	*No. of patients*	*Daily dose (mg.)*	*No. of patients*
1·25–5	45	17·5–20	21
7·5–10	34	22·5–30	29
12·5–15	30	32·5–40	13

2 patients received a maximum daily dose of 1·25 mg., but 8 received 45 mg. and 1 60 mg.

Methylamphetamine should be administered with care and no increase of dose greater than 2·5 mg. should be made, and then only after full knowledge has been obtained of the effect of the previous dose. Psychological disturbances and psychoses have been produced by daily doses of 50 mg. of amphetamine [3] so that any dosage of methylamphetamine above 30 mg. daily should be approached with special caution.

Bristol. G. DE. M. RUDOLF.

HARDENED FATS AND LUNG CANCER

SIR,—Professor Yudkin (May 14) claims that margarine contains essential fatty acids, although there can only be a question of one, linoleic; and, in comparing margarine with butter containing linoleic as well as arachidonic acid, he must have used the higher figures for linoleic-acid content in margarine and a low average for butter. He omits to mention arachidonic-acid content although this acid has a high biopotency and appears to be the principal essential fatty acid to be supplied by the food or synthesised in the body from linolenic or linoleic acid.

In comparing margarine with butter, undamaged vegetable oils, and animal fats I could have drawn attention to the fact that certain hardened fats accentuate fat-deficiency symptoms but, as this seems to be due to an increased essential-fatty-acid requirement, I thought it unnecessary at this stage to go further into this question.

Lung cancer is increasing rapidly, rural lung-cancer incidence is much lower than urban, and female lung cancer in most cases is about 22% of the male. These

1. *Practitioner*, 1955, **174**, 180.
2. Sargant, W., Slater, E. Introduction to Physical Methods in Psychiatry. Edinburgh, 1954; p. 170.
3. Delay, J., Pichat, P., Lemperière, T., Sadoun, R. *Ann. méd.-psychol.* 1954, p. 51.

features are reflected in our knowledge of the essential fatty acids: the average consumption of the acids is decreasing, rural produce (butter, eggs, bacon, &c.) is rich in the acids, there is a sex difference in the requirement of these acids, and for female rats it is 25% of that for the males.

Copenhagen. JOHAN E. NYROP.

SCHIZOPHRENIA OR GENETIC ENCEPHALOPATHY ?

SIR,—Adrian [1] and Murray [2] make clear that the brain can be grossly abnormal in the absence of microscopically demonstrable changes. Penfield and Jasper [3] describe hallucinatory experiences, many of which are typically "schizophrenic" except that they are episodic, associated with epileptic foci in the temporal lobes, reproducible by stimulation, and relieved by appropriate excisions. Penfield and Jasper look upon the temporal lobes as the storehouses of rememberable experience. The diagnosis of schizophrenia is not suggested by the total clinical picture: there are schizophrenic symptoms without psychosis.

The frontal lobes could hardly be responsible for less than is attributed to them by Penfield and Jasper—i.e., for planned initiative and the understanding of the future consequences of present action. Jasper and Penfield state that stimulation of the frontal lobes does not produce the dramatic evidence of function revealed by stimulation of the temporal lobes, but the fleeting distortion of planned initiative in a patient on an operating-table would hardly be expected to do so, although the same patient would soon run into trouble during the ordinary business of life if his planned initiative was distorted and his understanding of the future consequences of present action was seriously at fault. Add some temporal hallucinations to such a patient and his perplexity and alarm are understandable. Mental symptoms occur in the early stages of lesions in the "silent" areas,[4] and Miskolczy [5] suggested that the areas of the brain affected in schizophrenia are those which are typically human.

The very considerable and convincing research on hypothalamic dysfunction in schizophrenia collected by Gellhorn,[6 7] together with his own contributions, make it a reasonable proposition that in schizophrenia the lateral and posterior hypothalamus either is affected as part of the disease or is disordered by the disease. (The lateral and posterior nuclei have developed throughout the mammalian series pari passu with the neocortex, both reaching the highest development in man.[8]) Possibly both statements are true, although I suggest that schizophrenia is more likely to produce autonomic changes than are autonomic changes to produce schizophrenia. Anatomically [8] and physiologically [6 9] the functional integration between the cortex, especially the frontal cortex, and the diencephalon is so intimate that in the matter of nervous activity one is back with the hen and the egg. At any rate, add autonomic dysfunction to the frontal and temporal "paræsthesiæ" of the mind already suggested and the picture of schizophrenia is fairly complete.

The evidence concerning heredity, the early age at which schizophrenia develops, and the absence of any conclusive proof incriminating known pathogenic influences all suggest an inborn error producing ontogenetically inevitable pathology, or pathology made manifest by factors not recognised at present to be pathogenic.

The hypothesis is advanced that schizophrenia is a progressive disease process which throws regions of the brain into disorder and then out of action, which spreads usually from the frontal poles backwards (although it may start in the temporal lobes or in the hypothalamus), and which spreads in tidal fashion with periodic recessions during any one of which the disease may become arrested. It is further suggested that schizophrenia would be better known as phylogenetically and ontogenetically determined encephalopathy (the shortened term "genetic encephalopathy" would probably cause no difficulty despite other genetic encephalopathies).

If this hypothesis stands then:

(1) The disease must be unknown in animals and in very young children.

(2) Depending on the area first or mainly affected, there would be indeterminate "types."

(3) Dysfunction in the hypothalamus would produce pituitary, suprarenal, thyroid, and sex-gland disturbances, without actual disease in those structures.

(4) The early symptoms would be due to active disorder in brain cells, with dramatic symptomatology, giving way more and more to loss of function and a form of mental defect. As a corollary, "cures" of schizophrenia could result only in a level of human achievement which was less than that which might have been expected from early promise.

(5) The electro-encephalogram would reveal atypical abnormalities, varying with the stage of the disease.

(6) Patients with active disturbance could be helped by the removal or destruction in situ of parts disturbed.

(7) However selective the toxin which imitates schizophrenia in its action, it would produce in addition effects on other parts of the brain, with more vivid and elementary hallucinations, motor and sensory changes, and disturbances of consciousness tending towards coma which are not observed in schizophrenia. Moreover, such toxins would be most harmful to acute schizophrenics but cause less than normal disturbance in chronic schizophrenics.

St. Ann's Hospital,
Canford Cliffs, Dorset. D. N. PARFITT.

CHLORPROMAZINE

SIR,—Dr. Vaughan and his colleagues (May 28) state that chlorpromazine is not a curative drug, but this does not detract from its value as a "special" sedative and resocialising agent.

Chlorpromazine is clearly more successful than dummy tablets, but I feel it must also be controlled against drugs producing equivalent sedative effects before the word "special," as a description of its effect, can be justified. Until this has been proved chlorpromazine should not be allowed to supplant the much less toxic cheaper sedatives in common use.

It would be interesting to know if other methods of resocialisation had been used in the treated patients, such as nursing in groups with a total daily programme.

I feel there is a danger of reverting to the massive sedation of chronic patients with even more toxic drugs, and the recent advances in nursing techniques, which depend upon an unsedated patient, are in danger of being overlooked.

Hill End Hospital,
St. Albans. G. I. TEWFIK.

OCCLUDING FOLEY CATHETERS

SIR,—Various forms of clips and clamps are used to occlude the inflating tube of Foley catheters. Many of these devices are crude and heavy and cause permanent damage to the tube.

A simple and effective method—for which no originality is claimed—makes use of a circular disc of thin tin-plate or aluminium approximately $1^1/_2$ in. in diameter (the tops of certain brands of intravenous litre flasks are ideal). This disc is bent to about a right-angle across its diameter; the inflating tube is laid in the broad groove thus formed; the catheter bulb is then inflated and the disc is briskly bent twice—first across the diameter in which the tube lies, and then at a right-angle to this. The whole forms a quarter-circle.

The side tube is thereby firmly occluded. The mechanism is light in weight and will not drag on the catheter.

1. Adrian, E. D. *Brit. med. J.* 1954, i, 287.
2. Murray, E. G. D. *Lancet*, 1954, i, 221.
3. Penfield, W., Jasper, H. Epilepsy and the Functional Anatomy of the Human Brain. London, 1954.
4. Symonds, C. P. *Proc. R. Soc. Med.* 1931, **24**, 1007.
5. Miskolczy, D. *In* Schaffer and Miskolczy's Histopathologie des neurons. Leipzig, 1938.
6. Gellhorn, E. Autonomic Regulations. New York, 1943.
7. Gellhorn, E. Physiological Foundations of Neurology and Psychiatry. Minneapolis, 1953.
8. Le Gros Clark, W. E., Beattie, J., Riddoch, G., Dott, N. M. The Hypothalamus. London, 1938.
9. Delay, J. *Pr. méd.* 1947, **60**, 120.

The cost is nothing. I have never known the method to fail in securing and maintaining the inflation of the bulb. Nor does it damage the delicate rubber tube.

Royal United Hospital, Bath. A. T. MATHESON.

RESEARCH AND THE PATIENT

SIR,—Professor Witts (May 28) does Birmingham an injustice in implying that William Withering lived at Edgbaston Hall and established the use of digitalis "before the establishment of a hospital in Birmingham."

The hospital I have the honour to serve is the successor of the Birmingham Infirmary established under the Poor Law in 1740, and of high repute in Withering's time. The General Hospital, Birmingham, was established in 1765, although not opened until 1779; Withering was one of the four original physicians.

Withering settled in Birmingham in 1775 and began his ten years' research on the foxglove. His earlier patients he saw at his consulting-rooms in Temple Row, and his later ones in the Square. It is most unlikely that he ever saw patients (except in emergency) at Edgbaston Hall, and in any case he only moved into the hall a year after the publication of *An Account of the Foxglove* in 1785.

Thus two hospitals had been established in Birmingham before Withering began his research, and he was on the staff of one of them while he was completing the research.

Summerfield Hospital, Birmingham, 18. ROBERT J. HETHERINGTON.

LUNG CANCER AND SMOKING

SIR,—I notice that in the investigations into the relation between tobacco-smoking and cancer of the lung, research-workers generally expose animals to tobacco fumes or paint chemicals contained in tobacco on the skin. There is also a lot of discussion about the compounds which may be vaporised and inhaled at the temperature of a lighted cigarette.

Has anyone considered the possible importance of inhaled fragments of cigarette tobacco? The customary method of inhalation will on occasions carry a piece of tobacco down the respiratory tract. Most smokers have at times experienced this, and small pieces would perhaps stay for long periods in contact with respiratory epithelium. Such events, if they occur by chance, would be more common in heavy smokers, and would not occur when an efficient filter is used. The insufflation of minute pieces of cigarette tobacco into the lungs of mice might be a profitable experiment.

Virus Research Institute, Entebbe, Uganda. CEDRIC MIMS.

SIR,—The recent claim that there is a definite association between lung cancer and smoking in males raises the whole question of the validity of certain statistical techniques used in these inquiries. I refer especially to the indiscriminate application of the χ^2 test and equal samples to statistical data.

It is generally agreed that the χ^2 test is only applicable in a normal or nearly normal distribution with a well-defined tail at each end, yet in these investigations it has been used in what is a distribution of Poisson type and where a large sample is necessary before a tail will emerge to the right.

The proportion of smokers among middle-aged men in the U.S.A. is about 90%, and in England and Wales about 95%.[1] In 1952 the number of male lung-cancer deaths was 11,981, mainly among men of 30 and over, numbering 11,857,000. If an average expectation of life of 15 years be assumed for a lung-cancer case we therefore obtain a prevalence (case-rate) of 1·5% for this disease. There is reason to believe, however, that the lung-cancer population in the male community is as low as 0·2%.

Denoting by S and C the presence of the attributes smoking and lung cancer, and by s and c their absence respectively, in the male population, the following 2 × 2 table results, where p_1 and p_2 represent the probability of smoking and lung cancer respectively:

	C	c	
S	x	.	Np_1
s	.	.	.
	Np_2	.	N

Np_1 and Np_2 are the average number of smokers and lung cancer cases expected in a representative sample N of males and x is the number of smokers with lung cancer (CS) occurring in the top left-hand cell.

Np_1 is much greater than Np_2 and x can range from 0 to Np_2. The expected value of x on the basis of non-association between S and C is $Np_1\,p_2$ which is close to the maximum value of x possible, namely Np_2.

Given x Np_1, Np_2 in the sample N the values in the remaining 3 cells are obtained by differencing.

Denoting the probability of a value x occurring, assuming no association between S and C, by Px, the probability curve of the distribution over the whole possible range of x is obtained from the formula

$$Px = \frac{(Np_1)!\,(Np_2)!\,(Nq_1)!\,(Nq_2)!}{(N)!\,(x)!\,(Np_1-x)!\,(Np_2-x)!\,(Nq_2-Np_1+x)!}$$

As an example, taking N = 1000, p_1 = ·90, p_2 = ·015 we get Np_1 = 900, Np_2 = 15. The expected value of x is $Np_1\,p_2$ = 13·5. It is seen that low values of x are very improbable and the range within which x occurs according to chance is $Np \pm \sqrt{Npq}$ = 13·5 ± 3·5 or 10 — 17 within which the maximum value of x possible—i.e., 15—lies. The χ^2 test could not be applied here as no tail exists to the right. For a tail to emerge Np_2 would have to be greater than 810 or N greater than 53,300.

x	Px
0	·0000
.	.....
.	.....
7	·0000
8	·0002
9	·0018
10	·0100
11	·0421
12	·1287
13	·2692
14	·3445
15	·2035
	1·0000

In testing the significance of the association between two attributes in a universe their respective frequencies must be considered. This is quite a different problem to that of testing for the significance between the frequencies of a given attribute in two different and independent communities. As an example of the first problem we have the association between smoking and lung cancer and of the second, a comparison of the incidence of dysentery, say, in London and Manchester. Equal sampling can only be used in the latter type of problem.

The 2 × 2 table of Dr. Doll and Professor Bradford Hill[2] is an artificial one and not a random sample of the male universe. It is so distorted as to form a veritable strait jacket for x, the possible range being 1289–1357, only 5% of the lung-cancer cases. The distribution is the normal type with a tail at each end. As would be expected the χ^2 test gives high significance.

Assuming, for example, that the lung-cancer frequency is 1·5% the probability of obtaining equal numbers of C and c is $\frac{(2714)!\,(0{\cdot}985)^{1357}\,(0{\cdot}015)^{1357}}{(1357)!\,(1357)!}$ which is so improbable as to be impossible (log P< −1570). The test is thus meaningless and leads to a false conclusion.

According to the samples, the proportion of smokers among males is 97·5% and among non-lung cancer cases 95·5%.

	C	c	
S	1350	1296	2646
s	7	61	68
	1357	1357	2714

The number of lung-cancer cases is Np_2 = 1357 and, assuming p_2 = 0·015, these would be expected from a male sample N = 90,467. The expected number of lung-cancer cases among this sample of males would be 90467 (0·015) (0·975) = 1323. The maximum value of CS cases possible, namely 1357, lies within the range 1323 ± $\sqrt{1323}$, or 1287 — 1359, and therefore well within the range of values due to chance selection. So that if all 1357 lung-cancer cases were smokers the fact would not be significant.

The following table gives the minimum values for samples necessary for a tail to emerge to the right of the probability curve.

p_1	p_2	Np_2	N
0·950	0·015	3370	224,670
0·955	0·015	4190	279,300
0·975	0·015	13850	922,300
0·950	0·002	3420	1,710,000
0·955	0·002	4250	2,125,000
0·975	0·002	14040	7,020,000

It is seen that in order to be able to apply the χ^2 test for significance, assuming the proportion of male smokers

1. *Lancet*, 1952, ii, 668.

2. *Brit. med. J.* 1952, ii, 1271.

to be 97·5%, a sample of at least 14,000 lung-cancer cases would be needed. If the proportion of smokers however is taken to be 95% the least sample required is 3400.

To sum up, because of the high frequency of smoking and low frequency of lung cancer among males, a greater proportion of smokers in lung-cancer males than among other males is to be expected and larger samples are required than those taken in order to show whether this is statistically significant; moreover, the technique of equal samples in such an investigation is inadmissible. Incidentally, it is difficult to see how an attribute with a high frequency like smoking can be the cause of a low-frequency attribute like lung cancer.

Bromley, Kent. C. A. GOULD.

ELECTROPHORESIS OF PLASMA-PROTEINS

SIR,—From Dr. Owen's letter of April 23, I understand that he is able to separate two components of the β-globulin fraction of the human serum by using paper electrophoresis. He does not mention the time factor and the electric potential necessary to split the β-globulin into its two components. This gives me an occasion to quote Wiedermann's paper,[1] describing a method of separation which I have confirmed in many cases.[2] If the electrophoresis is performed in a wet tank (with 5-volt-per-cm. filter-paper, a 'Veronal'-Na-HCl buffer, pH = 8·6, I = 0·05), not for the usual 8–10 hours, but for 16–20 hours, the β-globulin falls into two components. If the separation is continued for 20–24 hours the γ-globulin will also separate into two components. Using a more alkaline buffer (pH 9–9·6), the separation becomes faster.

Laboratory of the Pædiatric Clinic no. II, University of Budapest. M. MILTÉNYI.

POTASSIUM DEFICIENCY AND KWASHIORKOR

SIR,—Hansen and Brock[3] reported that potassium retention exceeded the theoretical potassium/nitrogen ratio of 1/3 in 6 children admitted with diarrhœa, œdema, and hypo-albuminæmia. All these children had hypokalæmia, and in 2 treatment with a mixture of sodium and potassium salts alone was accompanied by electrolyte shift and loss of œdema. They were careful to point out that all the children had œdema and diarrhœa while only some of them presented the other signs usually associated with the term kwashiorkor. They may well be right in suggesting that electrolyte imbalance is important in the pathogenesis of nutritional œdema of the type they describe. I am sure they would not claim, from their experience in 2 children, that it is the only factor involved in all such cases.

Heller and Schnieden[4] have shown that normal serum-potassium levels may be found in children with kwashiorkor in Uganda. These children all had œdema, hypo-albuminæmia, and changes in colour and texture of the hair and/or skin. Diarrhœa is a common, but by no means universal, feature of kwashiorkor as seen in the Kampala area of Uganda (it is probably less common here than in South Africa). Heller and Schnieden mentioned that severe diarrhœa was not a feature of the cases they investigated. While agreeing with them that hypokalæmia is not an intrinsic feature of kwashiorkor in this area I should like to point out that potassium deficiency (which may exist in the presence of a normal serum-potassium level) may be an important complication in cases with severe diarrhœa. It may arise during treatment of children who have a normal serum-potassium level on admission.

1. Wiedermann, D. *Schweiz. med. Wschr.* 1953, **83**, 1208.
2. Miltényi, M. *Kisérletes Orvost.* 1954, **6**, 369.
3. Hansen, J. D. L., Brock, J. E. *Lancet*, 1954, **ii**, 477.
4. Heller, H., Schnieden, H. *Ibid*, March 19, 1955, p. 618.

It has been stated[5] that the diagnosis of potassium deficiency should be based on the existence of conditions predisposing to potassium loss. In kwashiorkor with diarrhœa such conditions certainly exist and may be aggravated by high-protein feeding after admission to hospital. The clinical diagnosis of potassium deficiency is particularly difficult in kwashiorkor since anorexia, diarrhœa, weakness, and less commonly vomiting are also features of uncomplicated kwashiorkor.

Recurrence of anorexia, specially if associated with vomiting, abdominal distension, and weakness, in a child with past or present diarrhœa, should, I think, make one suspect potassium deficiency. Before this was recognised 9 out of 13 children presenting this picture went progressively downhill and died. It is significant that 6 who received intravenous saline and glucose all died.

Since the introduction of subcutaneous potassium therapy only 6 out of 15 such children have died. Of these, 2 had other severe complications, and only very limited potassium therapy was given to the other 4. Unfortunately many of the earlier children had to be treated without the serum-potassium being examined. Later estimations of serum-potassium were made by the method of King[6] with the following results:

	No. of children	Serum-potassium (m.eq. per litre) Mean	Range
Children without kwashiorkor or diarrhœa	6	4·7	4·0–6·1
Kwashiorkor:			
No diarrhœa on admission	3	5·7	5·4–6·4
Diarrhœa on admission	7	4·0	3·1–5·6
Kwashiorkor with clinical potassium deficiency *	4	2·6	1·6–3·6
On recovery	2	5·8	5·7–5·9

* 2 of these children had normal serum-potassium on admission.

Electrocardiographic signs were also non-specific and cardiograms were not always obtainable. In 9 children with suspected potassium deficiency long P–R intervals (more than 0·14 sec.) were found in half and flat T waves in all. There was no œdema of the chest wall when these tracings were made. In 5, cardiograms were repeated during recovery: although improvement was not dramatic all the cardiograms became normal except for one P–R interval which, although shorter, was still outside the normal limit. QTc was measured by several methods. The results were so variable, even in the same cardiogram, that no significance could be attached to the measurement.

With this supporting evidence, replacement therapy was more energetically pursued, and children admitted with a history of diarrhœa, or who get diarrhœa later, are now given prophylactic potassium chloride (1·0 g. daily) by mouth. Children with subclinical deficiencies probably receive sufficient potassium in their milk to overcome their deficit.

Absolute evidence of potassium deficiency can be obtained only by dramatic response to intravenous therapy or by the demonstration of excessive retention by balance technique as used by Hansen and Brock. In view of the dangers of potassium intoxication it was considered wiser to rely on gradual replacement in these cases. Although the therapeutic response was gradual, and therefore not diagnostic, the contrast with the fate of earlier children presenting a similar picture and not receiving potassium was striking. In 2 cases serial cardiograms and serum-potassium levels showed parallel gradual improvement.

My regret that these findings are too few and not specific enough for detailed publication is mitigated by the fact that I have had no further cases presenting with severe potassium deficiency.

I am indebted to Prof. A. W. Williams for his interest and help in interpreting the cardiograms and to Miss M. Lyle for some of the potassium estimations.

Mulago Hospital, Kampala, Uganda. M. D. THOMPSON.

5. MacPhee, I. W. *Brit. med. J.* 1953, **ii**, 528.
6. King, E. J. Microanalysis in Medical Biochemistry. London, 1951.

Medicine and the Law

Inspection of Surgery

THE London Executive Council dealt last week with the case of a doctor who refused to permit the inspection of his surgery. Clause 7 (5) of the N.H.S. Terms of Service requires that a doctor shall permit the inspection of his surgery by a duly authorised member or officer of the local executive council.

In March, 1955, the chairman of the London Executive Council directed that the surgery of Dr. X should be inspected, and the practitioner was asked to state convenient dates and times. Dr. X wrote stating that he occupied a small flat part of which was used as a consulting-room and living-room; he was not prepared to allow any intrusion into his private dwelling and, as he had only a small list of patients, the question of inadequate waiting-room accommodation did not arise. Dr. X further stated that, if his surgery was detached from his private dwelling, he would have no objection to an inspection provided it were carried out by an official other than a doctor, but his search for larger premises had been unsuccessful.

Dr. X was asked to attend before the medical service committee, but he replied that he was still unwilling to allow an inspection of his surgery to be made and that he did not propose to attend the meeting.

The council decided to make representations to the Minister of Health that the sum of 5 guineas be withheld from Dr. X's remuneration. Dr. X has twenty-eight days in which to appeal.

Diary of the Week

JUNE 5 TO 11

Monday, 6th

GUY'S HOSPITAL MEDICAL SCHOOL, London Bridge, S.E.1
5 P.M. Dr. J. M. H. Campbell: Acyanotic Congenital Heart-disease. (Carbutt lecture.)

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
4.30 P.M. (Chelsea Hospital for Women, Dovehouse Street, London, S.W.3.) Mr. William Hawksworth: Utero-vaginal Prolapse.

Tuesday, 7th

WRIGHT-FLEMING INSTITUTE OF MICROBIOLOGY, St. Mary's Hospital Medical School, Paddington, W.2
5 P.M. Prof. B. Ephrussi (Paris): Synthesis of Cytochromes in Yeast.

INSTITUTE OF DERMATOLOGY, St. John's Hospital, Lisle Street, W.C.2
5.30 P.M. Dr. H. J. Wallace: Vulval Atrophy.

Wednesday, 8th

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. R. W. Riddell: Moniliasis and Related Diseases.

Thursday, 9th

UNIVERSITY OF OXFORD
8.30 P.M. (Nuffield Orthopædic Centre, Wingfield-Morris Orthopædic Hospital, Oxford.) Mr. William Gissane: Problems in the Treatment of Injuries.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Prof. Milroy Paul (Colombo): Hæmorrhages from Head Injuries. (Hunterian lecture.)

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
4 P.M. Dr. Felope de la Balze (Buenos Aires): Normal and Pathological Testes.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Ophthalmology.* Mr. M. J. Gilkes: Cataracts associated with Neurodermatitis.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Henry Haber: Benign Epithelial Tumours.

UNIVERSITY OF ST. ANDREWS, Medical School, Small's Wynd, Dundee
5 P.M. Prof. H. A. Salvesen (Oslo): Relation of the Parathyroids to Bone Metabolism and Bone Disease.

Friday, 10th

POSTGRADUATE MEDICAL SCHOOL OF LONDON
4 P.M. Mr. P. McG. Moffatt: Use of the Ophthalmoscope in Medicine. (First of two lectures.)

UNIVERSITY COLLEGE, Gower Street, W.C.1
5.30 P.M. Prof. Otto Krayer (Harvard): Pharmacology of Veratrum Alkaloids: the Anti-accelerator Cardiac Action of the Secondary Amines.

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
3 P.M. (Hammersmith Hospital, Ducane Road, W.12.) Mr. A. N. C. Walker: Obstetric Fistulæ.

Notes and News

WORLD HEALTH ASSEMBLY

AT the World Health Assembly in Mexico City last week, it was decided to expand the World Health Organisation's anti-poliomyelitis programme. Previous plans have included the setting up of a network of poliomyelitis laboratories in recent months to study the different strains of virus identified in each participating country, as well as other viruses responsible for diseases similar to poliomyelitis. These laboratories are also studying the epidemiology of the disease and are making surveys of the natural immunity in different populations. Two further tasks will now be undertaken: the preparation and distribution of standard laboratory reagents in order to facilitate the work of national poliomyelitis centres; and the training of virus specialists in new tissue-culture techniques used in this work. A resolution was adopted to establish a world-wide fund to assist national programmes for the eradication of malaria. The fund, which would be fed by voluntary contributions from government and private sources, would be administered by W.H.O. The new fund would be devoted to the provision of supplies, equipment, and services to those governments whose needs could not be met through W.H.O.'s regular and technical assistance budgets.

APPROVED NAMES FOR DRUGS

THE British Pharmacopœia Commission has issued the following new supplementary list of approved names:

Approved name	*Other names*
Chlorhexidine	Bis-*p*-chlorophenyldiguanidohexane. Hibitane.
Diethylthiambutene*	3-Diethylamino-1 : 1-di-2′-thienyl-but-1-ene. Themalon.
Dimethylthiambutene*	3-Dimethylamino-1 : 1-di-2′-thienyl-but-1-ene
Ethylmethylthiambutene*	3-Ethylmethylamino-1 : 1-di-2′-thienylbut-1-ene.
Methyl Phenidate	Methyl 1-phenyl-2-piperidylacetate. Ritalin is the hydrochloride.
Phenindione†	2-Phenylindane-1 : 3-dione. Phenylindanedione. Dindevan.
Polymyxin	Antimicrobial substances produced by *Bacillus polymyxa*. (Specific substances are designated by a terminal letter; thus, Polymyxin E.)
Streptonicozid	A compound formed by interaction of a suitable streptomycin salt and isoniazid. Streptohydrazid.
Triprolidine	*trans*-1-2′-Pyridyl-3-pyrrolidino-1-*p*-tolylprop-1-ene. Actidil is the hydrochloride.

* Not intended for use in human medicine; diethylthiambutene is of interest in veterinary medicine.
† Replaces phenylindanedione as the approved name.

N.H.S. ACCOUNTS

FEW doctors, at the form-filling end, would suggest that the National Health Service's methods of book-keeping are lax and inadequate. But the Comptroller and Auditor-General in his annual survey of the N.H.S. accounts 1953–54 for England and Wales [1] and Scotland [2] once more politely voices the professional's slightly pained surprise at the amateur's apparent indifference to accounting niceties. Thus he relates with approval that the Ministry of Health has drawn the attention of hospital authorities to his plea for the "normal system of competitive tendering for supplies," but adds with distress that some hospitals still have not adopted or fully adopted the system. One group of teaching hospitals who have for five years been refusing to interfere with house-committee policy, have indeed agreed to reconsider the possibility of centralised group purchasing, but firmly add that "they would not expect more centralisation to result in better control of expenditure."

Again some hospital authorities have not yet completed the financial arrangements for the provision of medical services to local authorities, which the Ministry recommended at the beginning of 1953. Nor do the local authorities appear to have been coöperative. Some have resisted claims made by hospital authorities, and owing to "difficulties of apportionment" some £122,000 for the period up to March 31, 1952, is

1. H.M. Stationery Office. 1955. Pp. 41. 2s.
2. H.M. Stationery Office. 1955. Pp. 26. 1s. 6d.

still outstanding in the accounts of the Welsh regional hospital board.

The Comptroller, in both reports, refers severely to losses by fraud. Cashiers who take no annual leave and keys that are kept on tops of cupboards are in his view inconsistent with "normal accounting prudence." Disciplinary action and inventories of stores also seem to him to show certain weaknesses.

Among his polite admonishments he has included some interesting facts. At Dec. 31, 1953, of the 1728 full-time and 4684 part-time consultants in England and Wales 2175 (33·9%) were receiving distinction awards, but the Ministry did not know the total cost, nor how many awards went to full-time and how many to part-time consultants. Scotland is better informed, and on March 31, 1954, when there were 401 full-time and 395 part-time consultants, 74 (18·5%) full-time and 149 (37·7%) part-time consultants were receiving awards of which the total cost was £229,408.

The Comptroller also gives figures showing that the expenditure on compensation to hospital patients has risen from £23,636 in 1949–50 to £159,047 in 1953–54. The number of cases has risen from 507 to 1100. He points out that judgments in 1951 and 1954 have extended the hospitals' liability until it now covers the whole of their staff, "whether permanent or temporary, resident or visiting, full time or part time."

IRRADIATED BUTTERFLIES

AN increased incidence of abnormally marked butterflies was reported from Japan after the atomic explosion at Nagasaki. So Mr. E. M. Elmhirst, F.R.C.S., of Ipswich, has been dosing caterpillars and pupæ of the Large Cabbage White Butterfly (*Pieris brassicæ*) with 200–1000r of X rays with a view to finding out if irradiation affects the distribution of pigment. The effects observed in human beings subjected to X rays are contradictory: some skins darken, others become paler. The black areas on the wings of *P. brassicæ* are due to the same pigment as is found in man—melanin. Mr. Elmhirst's results so far have been rather puzzling: some butterflies appear normally pigmented but emerge from the chrysalis minus some of their legs or with broken antennæ. The greatest change in pigmentation has been a butterfly with grey instead of black patches on the wings; but presumably this butterfly belongs to the spring or early-summer brood, and normally all the "black" patches in this brood are grey—it is only the late-summer brood that has really black patches.

Genetic changes are also being studied, and Mr. Elmhirst has reached the third generation of inbred irradiated butterflies. The difficulty, however, in getting them to breed in captivity has led him to free them after staining the outer parts of the upper and lower surfaces of both fore and hind wings bright red with mercurochrome. Anybody seeing any such *P. brassicæ* is requested not to kill the butterfly but to let Mr. Elmhirst know at Trophy House, Grimwade Street, Ipswich, Suffolk, so that he can try to find their progeny. About 170 have been freed, and more are to follow. Most of the reports of sightings come from the country to the west of Ipswich, especially the vicinity of Colchester and Braintree; but one insect was sighted at Shoeburyness, and others have been reported from nearer London. This is not surprising, for *P. brassicæ* is famous as a migrant and usually travels westwards.

University of London

The title of professor of morbid anatomy in the university has been conferred on Dr. C. V. Harrison, in respect of his post at the Postgraduate Medical School of London.

Dr. Harrison, who at present holds the appointment of reader in morbid anatomy at the school, studied medicine at Cardiff and at University College, London. In 1929 he took the B.SC. and M.B. of the University of Wales and the University of London. After holding a house-appointment at the Cardiff Royal Infirmary he became assistant lecturer in pathology at the Welsh National School of Medicine. In 1938 he took the M.D. Lond. Later he became senior lecturer in pathology in the University of Liverpool. His published work includes papers on sympathectomy in arterial disease and hypertensive and ischæmic heart-disease.

At a recent examination for the academic postgraduate diploma in psychological medicine the following were successful:

R. W. A. C. Barton, R. H. Gosling, L. A. Hersov.

University of Sheffield

Dr. Margaret Middleton has been appointed clinical teacher in child health, and Mr. N. W. Reece, honorary demonstrator in surgery.

University of Edinburgh

Dr. J. H. F. Brotherston has been appointed to the chair of public health and social medicine in succession to Prof. F. A. E. Crew, F.R.S., who retires on Sept. 30.

Dr. Brotherston graduated M.B. from the University of Edinburgh in 1940. After holding house-appointments in Edinburgh he served with the R.A.M.C. from 1941 to 1946. He spent the next year at the London School of Hygiene and Tropical Medicine when he held a Rockefeller fellowship in public health. In 1948 he was appointed joint lecturer in social and preventive medicine to the school and to Guy's Hospital Medical School. In 1949 he was given leave of absence to work, with a Rockefeller fellowship, at Johns Hopkins University School of Hygiene and Pittsburgh University Graduate School of Public Health. He was also a consultant to the United States Public Health Service. In 1951 he became senior lecturer in public health at the London School of Hygiene, and for a year he was also part-time divisional medical officer in south-west Hertfordshire. Two years ago he was appointed to the readership in public health at the school. In 1952 he published a monograph on the early public-health movement in Scotland.

Royal Australasian College of Physicians

The following, having satisfied the board of censors in Australia, have been admitted to membership:

D. T. Church, B. D. Cotton, A. W. T. Edwards, D. A. Ferguson, R. A. B. Holland, R. G. Lewis, D. C. Maddison, R. S. Packard, R. D. Spooner, Claire Weekes (New South Wales); Peter Ebeling, K. F. Fairley, W. S. C. Hare, K. H. McLean, B. W. Neal, J. S. Penington (Victoria); T. M. Ferrier (Queensland).

The following, having satisfied the board of censors in New Zealand, have been admitted to membership:

W. M. W. Brookfield, R. H. Culpan, P. W. Dykes, G. F. Hall, R. W. Hornabrook, J. D. McCreanor, J. R. Presland, D. H. H. Pullon, F. T. Shannon, C. M. Stubbs, J. M. Tweed, M. H. Watson, R. D. Wigley.

Faculty of Ophthalmologists

The following have been elected officers for 1955–56:

President, Dr. John Marshall; vice-presidents, Mr. T. Keith Lyle, Mr. J. R. Wheeler; hon. treasurer, Mr. A. McKie Reid; hon. secretary, Mr. E. F. King.

Beit Fellowships for Medical Research

The following elections have been made to junior fellowships (£800 a year):

P. C. Caldwell, M.A., D.PHIL. Oxfd. To investigate the mechanism of muscular contraction in crustacea at the Marine Biological Laboratory, Plymouth.

R.-H. Côté, B.A., B.APP.SC., D.SC. Laval, Quebec. To investigate the chemical constitution of human blood-group substances of the A, B and O Lewis systems, at the Lister Institute of Preventive Medicine, London.

Miss E. I. B. Dresel, M.A., PH.D. Camb. To investigate the biosynthesis of porphyrin pigments, at University College Hospital Medical School, London.

J. M. Lowenstein, B.SC. Edin., PH.D. Lond. To investigate the biosynthesis of pyrimidines in mammals, at the department of biochemistry, University of Oxford.

R. Whittam, B.TECH.SC. Manc., D.PHIL. Sheff. To investigate the metabolism of adenine nucleotides in relation to the active transport of inorganic ions, at the Physiological Laboratory, University of Cambridge.

Little Committee for the Study of the Infantile Cerebral Palsies

A century after the publication of Little's classical descriptions of cerebral palsy, this committee has been formed to study the clinical problems of diagnosis, prognosis, and management, and the administrative problems of training medical and other personnel for work on cerebral palsy. The members are:

Dr. W. R. F. Collis (chairman), Mrs. Eirene Collis, Dr. William Dunham, Dr. L. T. Hilliard, Sir Francis Walshe, F.R.S., and Dr. David Lawson (secretary). Dr. Lawson's address is Queen Mary's Hospital for Children, Carshalton, Surrey.

Commonwealth Bursaries

The latest awards under the Royal Society and Nuffield Foundation Commonwealth bursaries scheme include the following:

To Dr. A. A. Kinnear, Institute for Pathology, University of Pretoria, to enable him to study endocrinological techniques at Birmingham.

To Dr. J. H. D. Millar, consulting neurologist, Royal Victoria Hospital, Belfast, to enable him to study electrocorticography at the Montreal Neurological Institute.

This is the third group of awards under the scheme, instituted in 1953 to provide facilities for increasing the efficiency of scientists of proven ability by enabling them to pursue research, learn techniques, or follow other forms of study in natural science in countries other than their own in the Commonwealth where the physical or personal environment are peculiarly favourable.

Deutsche medizinische Wochenschrift

Original articles in this journal are now followed by summaries in English and Spanish.

Society for the Study of Fertility

This society is to hold a conference in Birmingham on June 23 and 24. Further particulars may be had from Mr. H. H. Fouracre Barns, 31, Weymouth Street, London, W.1.

Middlesex Hospital Medical School

Prof. Corneille Heymans (Ghent) will give a lecture on the History of the Development of our Knowledge of the Physiology of the Baroceptors and Chemoceptors, on Tuesday, June 7, at 4.30 P.M., in the medical school.

Pembury Hospital, Kent

Two stained glass windows were dedicated by Bishop J. C. Mann in Pembury Hospital Chapel on May 22 to the memory of F. Carter Browne and E. C. Hughes, surgeons to the hospital, and also of Amelia Scott, a social worker.

Cambridge Graduates' Medical Club

The annual general meeting and dinner this year will be held at Jesus College on Friday, June 24. Members of the club who have not received a notice, or who have not yet notified their intention to be present, should communicate with Dr. T. B. Anderson, 1, Huntingdon Road, Cambridge.

International Congress on Diabetes

The second congress of the International Diabetes Federation is to be held at Cambridge from July 4 to 8, under the presidency of Sir Lionel Whitby. On July 4 Dr. Elliott P. Joslin will deliver the Banting lecture of the British Diabetic Association. He has chosen as his subject Diabetes for the Diabetics. Further information may be had from the office of the congress, 152, Harley Street, London, W.1.

Symposium on Stammering

The Goldsmiths' College announce a public symposium on stammering to be given on Monday, June 20, by students of Mr. H. V. Hemery's speech re-education classes for stammerers. Of the three assistant chairmen, two will be members of the medical profession. The meeting will be in the small concert hall of the college, New Cross, London, S.E.14, and will begin at 6.45 P.M.

Royal Society of Tropical Medicine and Hygiene

The society's annual meeting will be held at Manson House, 26, Portland Place, London, W.1, on Wednesday, June 15, at 7.30 P.M., when Prof. R. M. Gordon will be inducted as the new president. Afterwards, to mark the centenary of the birth of Sir David Bruce, Sir William MacArthur will give an address entitled an Account of Some of Sir David Bruce's Researches, Based on his own Manuscript Notes.

Postgraduate Medical School of London and Hammersmith Hospital

The school's 20th anniversary and the hospital's jubilee are to be celebrated next week. On Monday, June 6, the Queen is to visit the hospital. Wednesday, June 8, will be an Open Day, from 2.30 to 5.30 P.M., when there will be an exhibition illustrating the school's research work, and doctors will be able to see a programme of medical films in the lower lecture-theatre.

Radioactive Materials in Biological Assay

This subject is to be discussed at a joint meeting of the biological and physical methods groups and the Scottish section of the Society for Analytical Chemistry with the Edinburgh and East of Scotland sections of the Royal Institute of Chemistry, the Society of Chemical Industry, and the Chemical Society on Monday and Tuesday, July 11 and 12, in the department of biochemistry, University New Buildings, Teviot Place, Edinburgh.

British Association of Urological Surgeons

This association is to hold its annual meeting from June 30 to July 2 at the Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C.2, under the presidency of Mr. Terence Millin. The programme includes a discussion on Calcification and Calculus Formation in the Upper Urinary Tract, and at a joint session with the section of urology of the Royal Society of Medicine. The subject is to be the Treatment of the Paraplegic Bladder.

Medical Golfing Society

In the society's summer meeting at the Berkshire Golf Club, Ascot, on May 26, Dr. J. G. H. McNabb won the *Lancet* cup (scratch medal 78) and the Henry Morris cup (2 up).

Inauguration of an Accident Service

From June 1 the Royal National Orthopædic Hospital, Brockley Hill, Stanmore (Grimsdyke 2900), is operating a twenty-four-hour accident service for the treatment of orthopædic injuries. There are facilities for the reception of injured direct from the site of the accident. Requests for admission or outpatient treatment should be made to the duty registrar.

Investigation of Tonsillectomy

The South East Metropolitan Regional Hospital Board has approved plans for an inquiry into the value of tonsillectomy (*Times*, May 26). At Farnborough Hospital, Kent, and perhaps other hospitals in that area, 1000 children on the tonsils waiting-list will be chosen for the trial: 500 will have their tonsils removed and 500 will not. The health of the two groups in the succeeding year will then be compared.

Dr. J. Ferguson Smith has been elected an honorary member of the German Dermatological Society.

Dr. K. G. Bergin, British Overseas Airways Corporation's medical superintendent at London Airport, has been elected a fellow of the Royal Aeronautical Society.

Copies of the report on pre-war diets, the subject of a note in our issue of May 21, have been sent to public libraries. The Carnegie United Kingdom Trust has only a limited number of copies for further distribution.

New British standards include a glossary of terms used in radiology (B.S. 2597/1955, price 10s.) and a standard for electrically heated blankets (B.S. 2612/1955, price 3s.). Copies are obtainable from the Sales Branch, British Standards Institution, 2, Park Street, London, W.1.

Births, Marriages, and Deaths

DEATHS

BUCKLEY.—On May 28, Charles William Buckley, M.D., F.R.C.P., of Bentley Corner, Ashbourne, and formerly of Burton, in his 81st year.

Appointments

BRATHERTON, D. G., M.B. Camb., F.F.R., D.M.R.T.: consultant radiotherapist, as asst. director of radiotherapeutic centre, and for East Anglian R.H.B.

DAVIDSON-LAMB, WILLIAM, M.C., M.B. Aberd., D.P.H.: deputy county M.O.H. and deputy principal M.O., Gloucester.

ELKINGTON, J. ST. C., M.D. Camb., F.R.C.P.: consultant neurologist, Royal National Throat, Nose and Ear Hospital, London.

FEINMANN, E. L., M.B. Manc., M.R.C.P.: consultant chest physician, Gateshead Tuberculosis Administrative Area, Newcastle R.H.B.

HELM, W. H., M.R.C.P.: consultant chest physician, Burnley and district hospitals, Manchester R.H.B.

KUPER, S. W. A., M.B. Witw'srand, D.P.H., D.T.M. & H., D.C.P.: whole-time clinical pathologist and biochemist, Brompton Hospital, London, S.W.3.

MACKAY, N. R., M.B. Aberd., F.R.C.S.E., D.M.R.T.: asst. radiotherapist (S.H.M.O.), Royal Marsden Hospital, London, S.W.3.

MEARA, R. H., M.B. Camb., M.R.C.P.: asst. physician, Middlesex Hospital, London.

NIKITIK, CONSTANTIN, M.D. Lwow, D.A.: consultant chest physician, South Shields H.M.C., Newcastle R.H.B.

O'CONNELL, DANIEL, M.B. Dubl., D.M.R.: first asst., radiotherapy department, Charing Cross Hospital, London.

THOMAS, L. P., M.B. Wales, F.R.C.S.: senior casualty officer, Cardiff Royal Infirmary, Cardiff.

WALKER, G. B., M.B. Edin., D.P.H.: group medical superintendent, Borders Hospitals board of management, South-Eastern R.H.B.

WEAR, A. R., M.B. Leeds, D.O.: senior consultant ophthalmic surgeon, special area committee, Cumberland and North Westmorland and the Dumfries and Galloway board of management.

London County Council:

BARNES, ROSALIND A., M.B. Lond., D.P.H., D.OBST.: whole-time M.O., Public Health Department.

HARVEY, HAROLD, L.R.C.P., D.P.H.: whole-time M.O., Public Health Department.

SHORE, ELIZABETH C., L.R.C.P., D.OBST.: whole-time M.O., Public Health Department.

Birmingham Regional Hospital Board:

FRIEND, J. H., M.D. Lond., M.R.C.P.: part-time consultant physician, Stoke-on-Trent group.

LEVISON, V. B., M.B. Lond., F.F.R., D.M.R.T.: whole-time consultant radiotherapist, Coventry and Birmingham (Dudley Road) groups.

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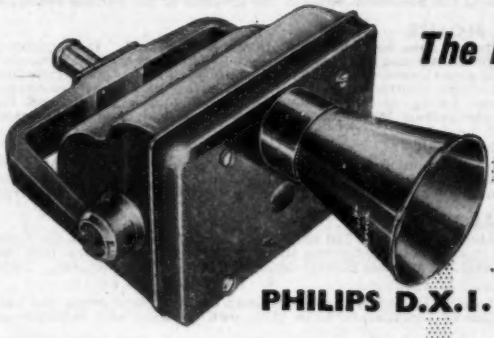

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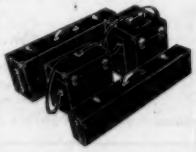

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The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

Academic and Educational

EXAMINING BOARD IN ENGLAND

by the
ROYAL COLLEGE OF PHYSICIANS OF LONDON
and the
ROYAL COLLEGE OF SURGEONS OF ENGLAND

Notice is hereby given that the following Examinations will commence on the dates stated below :—

DIPLOMA IN OPHTHALMOLOGY
6th July
DIPLOMA IN PHYSICAL MEDICINE
7th July
DIPLOMA IN INDUSTRIAL HEALTH
DIPLOMA IN TROPICAL MEDICINE AND HYGIENE
13th July

Applications and fees for either or both Parts of an Examination must reach the Secretary, Examination Hall, Queen-square, London, W.C.1, at least 21 days before Part I of the Examination begins. FRANCIS M. STENT, Secretary.

UNIVERSITY OF MANCHESTER

A COURSE in preparation for the DIPLOMA IN PSYCHOLOGICAL MEDICINE will commence in OCTOBER, 1955, subject to a sufficient number of candidates being available. The instruction is part-time, occupying 3 half-days per week for 8 terms.

Further particulars as to regulations and fees may be obtained from the Dean of Postgraduate Medical Studies, The University, Manchester, 13, to whom application to take the course should be made not later than Friday, 24th June.

THE UNIVERSITY OF LEEDS

DIPLOMA IN PSYCHOLOGICAL MEDICINE

A COURSE for the Diploma in Psychological Medicine will commence in OCTOBER, 1955, if sufficient entries are received. Instruction will be part-time and will occupy 3 half-days a week during 8 academic terms (two and a half years).

Further particulars may be obtained from the Sub-Dean, School of Medicine, Leeds, 2, to whom application for admission to the course should be sent as soon as possible.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY

(UNIVERSITY OF LONDON)
330/332, Gray's Inn-road, London, W.C.1

Week-end COURSE IN AURAL SURGERY 15TH, 16TH and 17TH JULY, 1955.

The Course is intended for Senior Students and practising members of the Specialty, and emphasis will be laid upon the practical aspects. Fee £5 5s.

Detailed syllabus obtainable from the Dean.

NATIONAL HEART HOSPITAL

Westmoreland-street, W.1, and BUCKINGHAM

The ST. CYRES LECTURE FOR 1955 will be delivered in the Barnes Hall of the Royal Society of Medicine, 1, Wimpole-street, W.1, on FRIDAY, 17TH JUNE, at 5 P.M. by Dr. LEWIS DEXTER of the Peter Bent Brigham Hospital, Boston, U.S.A.

Subject : Atrial Septal Defect.

Members of the Medical Profession are cordially invited.

UNIVERSITY OF LONDON. Postgraduate Medical SCHOOL. REGISTRAR (chemical pathology) required 1st October. Duties include routine work, demonstrations to the D.C.P. course, and research. The Registrar will be encouraged to work for a higher degree. National Health Service terms.

Applications, with the names of 2 referees, to the Dean, Postgraduate Medical School, Ducane-road, W.12, by 21st June, 1955.

UNIVERSITY OF CAMBRIDGE. Applications are invited for a LECTURESHIP IN MEDICINE. Candidates should preferably have extensive clinical and laboratory experience in hæmatology. Salary scale £1000–£100–£1700 with a conditional pensionable supplement not exceeding £120 p.a. F.S.S.U. and children's allowances.

Further particulars may be obtained from the undersigned with whom 10 copies of the application, with the names of 3 referees, should be lodged not later than 30th June, 1955.

Dr. M. G. P. STOKER, Secretary of the
Appointments Committee of the Faculty of Medicine.
Department of Pathology, Tennis Court-road, Cambridge.

UNIVERSITY OF SHEFFIELD. Chief Technician required as Steward in the Department of Medicine at the Royal Hospital to take charge of ordering and to supervise work in various branches of clinical pathology, including biochemistry. Applicant must be Fellow of the I.M.L.T. Wage according to scale £610–£20–£690. Superannuation scheme, good conditions of service.

Apply in writing, giving full details of qualifications and experience, and names of 2 referees, to the Bursar, The University, Sheffield, 10.

THE UNIVERSITY OF SHEFFIELD. Applications are invited for a post of SENIOR LECTURER IN PATHOLOGY to begin duties as soon as possible. Salary scale £1800–£100–£2400, with F.S.S.U. provision and family allowance.

Further particulars should be obtained from the Registrar, to whom applications (10 copies) should be sent by 25th June, 1955.

UNIVERSITY OF EDINBURGH. Applications are invited for a SENIOR LECTURESHIP in the Department of Pathology. Salary scale £1750–£100–£2250 p.a., with superannuation benefit and family allowance where applicable. The successful candidate will be expected to take up duty on 1st October, 1955, or as soon thereafter as possible.

Further particulars may be obtained from the undersigned, with whom applications (6 copies), together with the names of 2 referees, should be lodged not later than 25th June, 1955.

CHARLES H. STEWART, Secretary to the University.

UNIVERSITY OF ABERDEEN. Applications are invited for the post of LECTURER IN PUBLIC HEALTH AND SOCIAL MEDICINE. Diploma in Public Health essential. Salary scale (*b*) £1100–£1500, or scale (*a*) £700–£1000, with placing according to qualifications. Superannuation (F.S.S.U.) and children's allowance. Part of removal expenses refunded.

Conditions of appointment and forms of application should be obtained from the undersigned, with whom applications (8 copies), giving the names of 3 referees, should be lodged not later than 18th June, 1955. Applicants outside the British Isles may submit 1 copy only.

The University, Aberdeen. W. S. ANGUS, Secretary.

UNIVERSITY OF BRISTOL. Applications are invited for the post of DEMONSTRATOR IN BACTERIOLOGY AND ASSISTANT BACTERIOLOGIST. This appointment is for 1 year, and is intended to give the medical graduate experience in routine bacteriology and in demonstrating to medical and science classes. Salary £700 p.a.

Applications, giving full names, age, qualifications, details of education and experience, together with the names of not more than 2 referees and copies of not more than 3 recent testimonials, should reach the undersigned, from whom further particulars may be obtained, on or before 22nd June, 1955.

H. C. BUTTERFIELD, Registrar.

The University, Bristol, 8.

THE UNIVERSITY OF MANCHESTER. Derbishire HOUSE HEALTH CENTRE. Applications are invited for the appointment of an ASSISTANT GENERAL PRACTITIONER at the Derbishire House Health Centre for a period of 1 year. Duties to begin as early as possible. The work will entail assisting the 4 General Practitioners in the Centre. Salary £1000 p.a., with an allowance towards the cost of travelling expenses and superannuation.

Applications, which should include full particulars of qualifications, &c., must reach the Registrar, The University, Manchester, 13, not later than 14th June, 1955, and should give the names of not more than 3 persons to whom reference may be made.

THE NATIONAL ASSOCIATION FOR THE PREVEN-TION OF TUBERCULOSIS offers a POSTGRADUATE TRAVELLING FELLOWSHIP, value £250, to enable a doctor working in Scotland in the field of tuberculosis, to study abroad the treatment and control of tuberculosis.

Details from the Scottish Secretary, NAPT, 65, Castle-street, Edinburgh, 2. Closing date for applications : 15th July, 1955.

UNIVERSITY COLLEGE, Ibadan, Nigeria. Applications are invited for the following posts in the Faculty of Medicine :—

Anæsthesia.—LECTURESHIP (F.F.A.R.C.S. essential).

Bacteriology.—SENIOR LECTURESHIP and LECTURESHIP.

Clinical Biochemistry.—SENIOR LECTURESHIP-IN-CHARGE, and LECTURESHIP.

Medicine.—2 LECTURESHIPS.

Obstetrics and Gynæcology.—LECTURESHIP.

Pædiatrics.—SENIOR LECTURESHIP.

Pathology.—SENIOR LECTURESHIP IN HÆMATOLOGY and SENIOR LECTURESHIP IN MORBID ANATOMY.

Preventive and Social Medicine.—SENIOR LECTURESHIP or LECTURESHIP.

Radiology.—SENIOR LECTURESHIP and LECTURESHIP.

Surgery.—SENIOR LECTURESHIP (Traumatic Surgery).

Duties will consist of clinical work, research and preparation for clinical teaching for M.B., B.S., expected to begin in the new 500-Bed hospital scheduled to be completed in October, 1956. Rich field for research. Appointees will be offered honorary contracts by the Teaching Hospital. Salary scales at present : Senior Lecturer-in-charge £2600 p.a., Senior Lecturer £1750–£100–£2250 p.a., Lecturer £1500–£100–£2000 p.a. Point of entry on lecturer scale determined by qualifications and experience. All appointments for 3 years in first instance, thereafter to retiring age. Child allowance £50 p.a. per child (maximum £150 p.a.) for children resident in Nigeria or £100 p.a. per child (maximum £300 p.a.) for children resident elsewhere. Part-furnished accommodation at rent not exceeding 7·7% of salary. First-class passages for member of staff, wife and children (under 11 years) on appointment, annual overseas leave and termination. F.S.S.U. Outfit allowance £60 on first appointment.

Applications (12 copies), stating age, full qualifications and experience, and naming 3 referees, to be received by 20th June, 1955, by Secretary, Senate Committee for Colleges Overseas in Special Relation, University of London, Senate House, W.C.1, from whom further particulars may be obtained.

UNIVERSITY COLLEGE, Ibadan, Nigeria. Applications are invited for the following appointments in the Faculty of Medicine :—

SENIOR LECTURESHIP and 2 LECTURESHIPS IN ANATOMY.

LECTURESHIP IN PHYSIOLOGY.

Salary scales at present for medically qualified candidates : Senior Lecturer £1500–£100–£1900 p.a. Lecturer £900–£100–£1200/£1300–£100–£1500 p.a. Appointments for 3 years in first instance. Point of entry in Lecturer scale determined by qualifications and experience. Child allowance £50 p.a. per child (maximum £150 p.a.) for children resident in Nigeria or £100 p.a. per child (maximum £300 p.a.) for children resident elsewhere. Part-furnished accommodation at rent not exceeding 7·7% of salary. Passages paid for member of staff, wife and children (under 11 years) on appointment, overseas leave and termination. F.S.S.U. Outfit allowance £60 on appointment.

Applications (12 copies), stating age, full qualifications and experience, and naming 3 referees, to be received by 20th June, 1955, by Secretary, Senate Committee on Colleges Overseas in Special Relation, University of London, Senate House, W.C.1, from whom further particulars may be obtained.

Hospital Services : Senior Appointments

HOSPITALS FOR DISEASES OF THE CHEST. Brompton HOSPITAL, S.W.3. The Board of Governors invites applications for the appointment of ASSISTANT PHYSICIAN (Consultant) tenable at Brompton Hospital. The appointment involves attendance for 1 notional half-day each week to conduct an outpatient clinic and in the first instance will be confined to those duties. Further information may be obtained on request. Candidates are required to be Fellows or Members of the Royal College of Physicians of London.

Applications (9 copies), stating date of birth, qualifications and experience with the names of 3 referees, are to reach the undersigned not later than 16th July, 1955.

KENNETH A. F. MILES, Secretary to the Board.

Brompton Hospital, S.W.3.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Part-time ASSISTANT OPHTHALMOLOGISTS (Senior Hospital Medical Officer grade) at :—

(1) Essex County Health Services Clinics, as follows :—
Glasson House, Grays—2 sessions a week.
Annalee-road, Aveley—1 session a week.
Craylands, Vange—1 session a month.
Wickford—1 session a month.
Pitsea—1 session a month.
Westland-avenue, Hornchurch—1 session a month.

(2) Essex County Health Services Clinic, Coval-lane, Chelmsford, for 2 sessions a week.

(3) London County Council School Treatment Centres at Hackney Wick (1 session a week and 1 session a fortnight) and Hoxton (1 session a week).

(4) Woodberry Down Health Centre, N.4, for 1 session a week and 1 session a fortnight.

Applications (6 copies), stating post or posts concerned, and names of 3 referees, should reach the Secretary, 11A, Portland-place, London, W.1, by Saturday, 18th June, 1955.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CONSULTANT RADIOLOGIST (part-time, 4 half-days a week), Royal London Homœopathic Hospital, Great Ormond-street, W.C.1 (183 Beds). Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 4th July, 1955.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Birmingham (Selly Oak) Group**

SENIOR CONSULTANT ANÆSTHETIST (whole-time) in charge of Anæsthetic Services—Little Bromwich Hospital (158 general beds increasing to 476 ; 214 beds for infectious diseases). Centre for treatment of poliomyelitis cases. Experience respiratory problems of poliomyelitis an advantage and D.A. or F.F.A.R.C.S. essential.

(2) **Birmingham Education Committee Child Psychiatry Clinics**

Part-time CONSULTANT CHILD PSYCHIATRIST (8 notional half-days weekly). Duties in diagnosis and treatment of maladjusted children at Yardley Wood Road (4 notional half-days), George Road (2 notional half-days) and Birchfield Road (2 notional half-days). Wide experience, including good experience or training in child psychiatry essential.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 20th June.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. Locum Tenens CONSULTANT NEUROLOGIST required during August for 4 sessions weekly ; 2 sessions essential on Mondays.

Apply to Hospital Secretary with full details and sessions available.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited for the post of PHYSICIAN-SUPERINTENDENT of the Pewsey Mental Deficiency Hospital and its ancillary premises (960 Beds). The post is of Consultant status and will be whole-time or maximum part-time, at the option of the successful candidate, who will be required to live in or near the Hospital. A house is available. Candidates must hold the D.P.M. or its equivalent, should have had experience in the administration of an M.D. institution and be familiar with the statutory responsibilities prescribed by the M.D. acts and regulations. Candidates may visit the Hospital by arrangement with the Secretary, Pewsey Hospital, Marlborough, Wilts.

Applications (12 copies), stating age, qualifications, experience, and the names of 3 referees, should reach the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, by 1st July, 1955.

MANCHESTER REGIONAL HOSPITAL BOARD.

(*a*) Whole-time NON-RESIDENT CONSULTANT RADIOTHERAPIST, Christie Hospital and Holt Radium Institute; F.F.R. essential ; other higher qualifications desirable. 15th June, 1955.

(*b*) Part-time (8 notional half-days) CONSULTANT SURGEON, Crumpsall and Ancoats Hospitals, Manchester. (General —1200 and 150 Beds approximately.) Wide experience, higher qualifications essential ; appointee to live in North Manchester area. 22nd June, 1955.

(*c*) Whole-time or maximum Part-time ASSISTANT ANÆSTHETIST (Senior Hospital Medical Officer), Macclesfield Hospital Centre (Macclesfield General Hospital, &c.) to undertake duties amounting to about 35 hours a week, including some at Stockport, under direction of Consultant Group Anæsthetist. Appointee to live in Macclesfield. Higher qualification in anæsthetics desirable. 21st June, 1955.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by dates stated.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of Full-time SENIOR HOSPITAL MEDICAL OFFICER (non-resident). Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications, giving details of past experience and qualifications, together with the names of 3 referees, to be addressed to the undersigned as early as possible. (Special application forms can be obtained on request.)

F. J. CABLE, Secretary, United Manchester Hospitals.

LEEDS REGIONAL HOSPITAL BOARD. Appointment of SENIOR CASUALTY OFFICER (whole-time) for duties at the Royal Halifax Infirmary. The appointment will include duties in Casualty and Orthopædic Surgery at the above Hospital with associated ward and operating duties under the general supervision of the Consultant-in-charge. The person appointed will be required to reside in Halifax. The salary will be within the range of £1500–£1950 p.a. and the tenure of the post will be for a period not exceeding 4 years.

Applications (12 copies), stating age, qualifications, details of appointments held, showing dates, with names and addresses of 3 referees, to the Secretary, Park parade, Harrogate, before 25th June, 1955.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time non-resident post of CONSULTANT RADIOLOGIST in the service of the Board. The main duties are at Raigmore Hospital, Inverness, where the Officer is based, and periodic duties will arise at other hospitals in Inverness and elsewhere in the Region.

Applications, on schedules to be obtained from the undersigned, who will also supply further particulars, should be lodged by 25th June, 1955. A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.

Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT ANÆSTHETIST for the Sheffield No. 1 Hospital Management Committee Group with duties mainly at the City General Hospital, Sheffield. This Hospital has teaching affiliations with the University of Sheffield. There are Professorial Medical and Gynæcological Units, a Department of Thoracic Surgery and a Regional Cardiological Centre.

Further details and application forms from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 25th June, 1955.

SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of ASSISTANT PSYCHIATRIST at Roundway Hospital, Devizes, which contains approximately 1356 Beds. The appointment will be on a whole-time basis in the Senior Hospital Medical Officer grade. Applicants should possess the Diploma in Psychological Medicine, and previous experience of the diagnosis and treatment of mental diseases is essential. The successful candidate will work under the general direction of the Medical Superintendent of Roundway Hospital. An unfurnished house is available.

Applications (12 copies), stating date of birth, qualifications and experience together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 25th June, 1955.

WELSH REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) at Cefn Coed Hospital, Swansea (710 Beds). Modern treatments. Adult psychiatric outpatient clinics. Resident/non-resident.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

CANADA. VICTORIA GENERAL HOSPITAL, Halifax, NOVA SCOTIA. Applications are invited for the position of ASSOCIATE RADIOTHERAPIST. Preference will be given to applicants possessing a higher medical or surgical degree or equivalent. Salary scale : $11,000–$13,000 p.a., with limited right to private consultation. University affiliation. Superannuation and holidays with pay.

Application forms and further details may be obtained by writing Dr. C. M. BETHUNE, Superintendent, Victoria General Hospital, Halifax, Nova Scotia (Teaching Hospital). Closing date for applications 15th July, 1955.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD. DUNEDIN HOSPITAL AND UNIVERSITY OF OTAGO, NEW ZEALAND. Applications are invited for the position of RADIO-DIAGNOSTICIAN, Dunedin Hospital. Candidates must hold a degree in medicine of an approved University, and should possess a higher degree in the specialty. The position is a full-time one, and private practice is not permitted. The position is designated as that of a Senior Specialist under the Hospital Employment (Medical Officers) Regulations, 1952, and amendments, the salary scale being either (*b*) £NZ1940–£NZ2190 p.a. or (*c*) £NZ1690–£NZ1940 p.a., according to experience and qualifications, plus cost-of-living increase of £NZ82 p.a. The commencing salary will be that determined by the Medical Officers' Salaries Grading Committee. The position is a non-resident one. Travelling expenses are payable as stated in the conditions of appointment. Duties are to commence on 1st December, 1955. Application forms and conditions of appointment may be obtained from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or from the High Commissioner for New Zealand, 415, Strand, London.

Applications, stating age, qualifications and experience, together with copies of testimonials, and health and radiological certificates, will be received by the undersigned until 10 A.M. on Thursday, 14th July, 1955.

W. A. WILLIAMSON, Secretary.

Otago Hospital Board, P.O. Box 946, Dunedin, N.Z.

Hospital Services : Junior Appointments

BROMPTON HOSPITAL, S.W.3. Applications are invited for post of MEDICAL REGISTRAR (whole-time). Salary within the Registrar grade. The appointment is for 1 year commencing 1st August, 1955, with eligibility for reappointment. Candidates must hold the M.R.C.P. Diploma or the M.B. of a University.

Applications, stating age, qualifications with dates, nationality and appointments held, together with copies of testimonials, by 9th June, to KENNETH A. F. MILES, House Governor.

BROMPTON HOSPITAL SANATORIUM, Frimley. Applications invited for post of RESIDENT MEDICAL OFFICER, for 6 months in the first instance, with eligibility for reappointment. Salary within the Registrar grade. Previous experience of chest work desirable.

Applications, stating age, qualifications with dates, nationality, and appointments held, together with copies of testimonials, by 9th June, to KENNETH A. F. MILES, House Governor.

Brompton Hospital, S.W.3.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) HOUSE SURGEON required for 6 months (General Surgery and Special Departments). Post vacant 1st July, 1955. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to the Secretary, Hospital Management Committee Forest Group, Langthorne-road, E.11.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (graded Senior House Officer), vacant 4th July, 1955. Salary £745 p.a., less £150 p.a. for board-lodging, &c. Recognised for D.A. and F.F.A.R.C.S.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee Forest Group, Langthorne-road, E.11.

GERMAN HOSPITAL, London, E.8. (General—157 Beds.) Applications are invited from registered medical practitioners for the 6-months appointment of HOUSE SURGEON (now vacant) and should be sent to the Group Secretary, Hackney Hospital, London, E.9, quoting GH/HS.

GUY'S HOSPITAL, S.E.1. Applications are invited for the post of TRAINEE REGISTRAR in Diagnostic Radiology. Applicants should hold a higher qualification in medicine or surgery. The holder of this post will be remunerated at the rate for the grade of Registrar. Duties commence 1st October, 1955, with appointment for 2 years subject to review at the end of the first year, during which time the holder will be expected and given the opportunity to obtain a radiological qualification.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, S.E.1, not later than 28th June, 1955.

HAMMERSMITH HOSPITAL AND INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, Ducane-road, London, W.12. HOUSE OFFICER (obstetrics) required 1st August. Post recognised for M.R.C.O.G.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors by 15th June.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. ANÆSTHETIST (House Officer grade), resident, vacant 24th June. 100 active surgical and orthopædic beds, approximately 1200 operations annually.

Applications, with copies of 3 testimonials, to Hospital Secretary.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from medical practitioners (Male) for the appointment of HOUSE SURGEON to the Midwifery and Gynæcology Departments, to become vacant on 4th July. Appointment will be for a period of 6 months. National Health Service salary.

Applications to reach the Secretary on or before Thursday, 23rd June, 1955, together with copies of 3 recent testimonials.

HOSPITALS FOR DISEASES OF THE CHEST. London CHEST HOSPITAL. 2 vacancies occur 1st August, 1955, for RESIDENT HOUSE PHYSICIAN. Appointments for 6 months, 4 in London, 2 at the Country Branch, near Letchworth, and posts graded as House Officer. Duties include work in the Outpatient Department and Refill Clinic as well as in wards.

Applications, stating age, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 25th June.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

HOSPITALS FOR DISEASES OF THE CHEST. London CHEST HOSPITAL. Applications are invited for the appointment of Part-time MEDICAL REGISTRAR (grading : Senior Registrar). The duties require the equivalent of 5 notional half-days a week, including 1 Refill Clinic. The appointment is for 1 year from 1st September, 1955, and is renewable.

Applications, stating age, qualifications with dates, and previous appointments held and accompanied by copies of 3 testimonials, should reach the undersigned not later than 18th June. THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

LAMBETH HOSPITAL, Brook-drive, S.E.11. South West METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the post of SURGICAL REGISTRAR. The appointment is normally for 2 years but is subject to review at the end of 1 year. Recognised for the F.R.C.S. Duties include general surgery and some genito-urinary work. The post is resident or non-resident, but if the latter the successful applicant will be required to sleep in on nights on duty.

Forms of application (enclosing stamped addressed envelope) from the Secretary to whom all applications should be returned by 17th June, 1955.

MARIE CURIE HOSPITAL, 66, Fitzjohn's-avenue, Hampstead, N.W.3. Applications are invited from registered medical practitioners for the post of GYNÆCOLOGICAL HOUSE SURGEON (radiotherapy), vacant immediately.

Applications, with copies of testimonials, to the Administrative Officer.

MIDDLESEX HOSPITAL, W.1. Applications invited from fully registered candidates for the following posts, vacant 1st August :—

SENIOR RESIDENT ASSISTANT ANÆSTHETIST (graded as Senior House Officer).

JUNIOR RESIDENT ASSISTANT ANÆSTHETIST (graded as House Officer).

Forms of application obtainable from Deputy Superintendent should be returned, naming 2 referees, by 15th June.

MILE END HOSPITAL, Bancroft-road, E.1. Applications are invited for 2 posts of HOUSE OFFICER (second or third posts) obstetrics. Posts recognised in obstetrics for M.R.C.O.G Vacancy (*a*) 4th July, 1955, (*b*) 5th September, 1955.

Application forms, obtainable from Physician-Superintenden to be returned by 17th June, 1955.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. HOUSE OFFICER (resident), Medical or Surgical, to the Neurosurgical Department at the Maida Vale Hospital for Nervous Diseases, London, W.9. Appointment in the first instance for 6 months ; duties to commence 29th July, 1955. Grading as Senior House Officer or Registrar according to experience.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Maida Vale Hospital, W.9, not later than 11th June, 1955.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited for the post of HOUSE PHYSICIAN (resident) at Maida Vale Hospital for Nervous Diseases, London, W.9. Grading as Senior House Officer or Registrar, according to experience. Appointment for 6 months, renewable. Preference will be given to a candidate holding a higher degree.

Applications with copies of 3 recent testimonials, should be addressed to the Secretary at Maida Vale Hospital, W.9, by 11th June, 1955.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of REGISTRAR (whole-time) to the Department of Clinical Pathology at the National Hospital, Queen-square, W.C.1, to commence 1st September, 1955. This post carries the grade of Registrar. The appointment will be for 1 year in the first instance.

Applications, with names of 2 referees, to be sent to the undersigned not later than 25th June, 1955.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospital, Queen-square, W.C.1.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of ASSISTANT HOUSE PHYSICIAN (non-resident) at The National Hospital, Queen-square, to commence 14th August, 1955. The post carries the grade of Senior House Officer. The appointment will be for 6 months.

Applications, with names of 3 referees, to be sent to the undersigned not later than 25th June, 1955.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospital, Queen-square, W.C.1.

NEW END HOSPITAL, Hampstead, N.W.3. Casualty OFFICER (Junior Hospital Medical Officer).

Applications, giving age, qualifications, &c., together with copies of 2 recent testimonials, and name of 1 referee, to Surgeon-Superintendent, New End Hospital, Hampstead, London, N.W.3, within 10 days.

NORTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD.

REGISTRAR in Tuberculosis (resident or non-resident), Myland Hospital and Colchester Chest Clinic, Colchester, Essex.

SURGICAL REGISTRAR (resident), Black Notley Hospital, Braintree, Essex. Recognised for F.R.C.S.

REGISTRAR in Psychiatry (resident or non-resident), Severalls Hospital, Colchester, Essex.

MEDICAL REGISTRAR (resident), St. Johns and Chelmsford and Essex Hospitals, Chelmsford, Essex. Duties in Medical, Pædiatric, Premature Baby and Neonatal Departments.

MEDICAL REGISTRAR (non-resident), Queen Mary's Hospital for the East End, London, E.15.

MEDICAL REGISTRAR (resident or non-resident, sleeping in on duty nights), St. George-in-the-East Hospital, E.1.

Appointments subject to review after 1 year.

Separate applications in duplicate, with 2 copies of 2 recent testimonials, to Secretary, 11A, Portland-place, W.1, by 18th June, 1955.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited from registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE PHYSICIAN (third post) to above Hospital, for a period of 6 months from 10th July, 1955.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 18th June, 1955.

PADDINGTON GREEN CHILDREN'S HOSPITAL, London, W.2. (ST. MARY'S HOSPITAL.) Applications are invited for the post of CLINICAL ASSISTANT (Senior Registrar status) for 2 notional half-days, for a period of 12 months as from 1st August, 1955. The appointment is subject to annual review.

Applications stating age, nationality, qualifications with dates, present Hospital Service grading, together with details of previous experience, and names of 3 referees, should be sent to the Secretary, not later than 18th June, 1955.

PADDINGTON GENERAL HOSPITAL, Harrow-road, W.9. Applications are invited for the posts of 2 SENIOR HOUSE OFFICERS (anæsthetics), recognised for D.A. and F.F.A.R.C.S., commencing 1st July, 1955.

Applications, stating age, qualifications, medica school, experience, together with names and addresses of 2 referees, to reach Secretary to Committee by 13th June, 1955.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. QUEEN CHARLOTTE'S MATERNITY HOSPITAL. SENIOR HOUSE OFFICER in the Pædiatric Department. Resident post tenable from 8th August, 1955, to 31st March, 1956, in the first instance. Duties will include the supervision of the babies, research work under the visiting staff, and charge of the follow-up infant clinics. Previous experience at a children's hospital is essential and possession of a higher qualification is desirable.

Applications to the House Governor by 18th June on forms obtainable from 339, Goldhawk-road, W.6.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN HOSPITAL MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, BANSTEAD WOOD, SURREY. 2 HOUSE OFFICERS, 1 of these appointments will be made for 2 periods of 6 months, commencing 1st August, 1955, and 1st March, 1956. First period as House Physician and second as House Surgeon and Casualty Officer. The other appointment will be for 6 months only as House Physician from 1st August, 1955.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned, with copies of not more than 3 testimonials, on or before 13th June, 1955.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, London, E.15. JUNIOR CASUALTY OFFICER (Male or Female: House Officer, third post) required for 6 months commencing 1st July, 1955.

Applications, with copies of recent testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 11th June, 1955.

QUEEN MARY'S (ROEHAMPTON) HOSPITAL, London, S.W.15. (532 Beds.) REGISTRAR (radiology) required for whole-time duty. National Health Service terms and conditions of service.

Detailed applications (9 copies), giving nationality, date of birth, qualifications and experience, including present appointments and the names of 3 referees, should reach Ministry of Health, Hospital Management Branch, Norcross, Blackpool, Lancashire, by 25th June, 1955.

ROYAL FREE HOSPITAL. Applications are invited for the post of FIRST ASSISTANT to the Diabetic Department (Registrar grade). Duties to include some general medical work. Appointment to commence on 1st August, 1955, and to be for 1 year in the first instance.

Application forms may be obtained from the Secretary to the Board of Governors, the Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 29th June, 1955.

ROYAL FREE HOSPITAL. Applications are invited from registered Men and Women medical practitioners for the appointment of RESIDENT ASSISTANT PATHOLOGIST at the above Hospital. Salary in accordance with the Ministry of Health scale for House Officers. The appointment is for 6 months in the first instance, subject to possible reappointment for a further 6 months. Duties to commence on 1st September, 1955.

Application forms may be obtained from the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 1st July, 1955.

ROYAL FREE HOSPITAL. Applications are invited for the post of SENIOR RESIDENT ANÆSTHETIST. Applicants must be registered medical practitioners of not more than 10 years standing. The appointment is for 6 months from 1st September, 1955, with duties at the North Western Branch and Hampstead General Hospital. Salary in accordance with the Ministry of Health scale for Senior House Officers.

Application forms may be obtained from the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, London, W.C.1, to whom they should be returned not later than 1st July, 1955.

ROYAL FREE HOSPITAL. Applications are invited for the post of JUNIOR RESIDENT ANÆSTHETIST. Applicants must be registered medical practitioners of not more than 10 years standing. The appointment is for 6 months, duties to commence on 1st September, 1955. Salary in accordance with the Ministry of Health scale for House Officers.

Application forms may be obtained from the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, London, W.C.1, to whom they should be returned not later than 1st July, 1955.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. (279 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR (second) required at above Hospital. Candidates may visit the Hospital by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, Royal Northern Hospital, London, N.7, by 14th June, 1955.

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the post of REGISTRAR to the Department of Pædiatrics at the Victoria Hospital for Children. Candidates should have had good experience of work in a children's hospital, and should hold the Diploma of Membership of the Royal College of Physicians. The appointment will be for 1 year in the first instance, and the successful candidate will be required to take up duty on 19th September, 1955.

Applications, stating details of age, education, qualifications, experience, and the names of 2 referees, should reach the undersigned not later than 25th June, 1955.

P. H. CONSTABLE, House Governor.
St. George's Hospital.

ROYAL MARSDEN HOSPITAL (formerly The Royal Cancer Hospital), Fulham-road, London, S.W.3. Applications are invited for the full-time post of REGISTRAR in the Radiotherapy Department. Candidates must hold a Diploma in Medical Radiology.

Forms of application are obtainable from the House Governor to whom applications, together with the names of 3 referees, should be sent by 27th June.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the appointment of CLINICAL ASSISTANT (whole-time). The post is graded as Senior House Officer status and will include assisting in outpatient and inpatient work. The work is that of a Junior Registrar and provides wide experience in orthopædics. The appointment to commence 1st July.

Applications to be received by 10th June. Forms of application can be obtained from the House Governor, 234, Great Portland-street, London, W.1.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, BROCKLEY HILL, STANMORE, MIDDLESEX. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER for a period of 6 months; duties to commence 1st September, 1955.

Applications to be received by 17th June. Forms of application can be obtained from the House Governor at 234, Great Portland-street, London, W.1.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. PATHOLOGICAL REGISTRAR (clinical) vacant on 27th July, 1955. Applications are invited from Women medical practitioners who should have had experience of laboratory work. Canvassing will disqualify, but candidates are not precluded from visiting the Hospital if they so desire.

Form of application (enclosing stamped addressed envelope) from the Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11, to whom completed applications should be returned not later than 17th June, 1955.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of GYNÆCOLOGICAL HOUSE SURGEON at the above Hospital, vacant 18th July, 1955, for 6 months. Recognised for the M.R.C.O.G.

Application form from the Secretary.

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. (593 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (E.N.T., plastic, orthopædic, ophthalmology, &c.), resident or non-resident.

Applications, stating age, qualifications, experience, together with names and addresses of 2 referees, to be forwarded to Hospital Secretary immediately.

ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. Qualified medical practitioners are invited to apply for the following vacancies:—

HOUSE PHYSICIANS (2 vacancies). Provisionally registered candidates eligible.

HOUSE SURGEONS (2 vacancies). Provisionally registered candidates eligible. Appointments recognised for F.R.C.S.

HOUSE SURGEON (obstetrics and gynæcology). Post recognised for M.R.C.O.G. in obstetrics.

Appointments commence 1st August, 1955, are resident and limited to 6 months.

Applications by 17th June, 1955, on forms obtainable from the Hospital Secretary (112L).

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified general medical practitioners for appointment as Part-time MEDICAL OUTPATIENT ASSISTANTS in the following 4 vacancies:—

(1) Wednesdays, P.M.—as from week commencing 1st August, 1955.
(2) Fridays, A.M.—as from week commencing 1st August, 1955.
(3) Tuesdays, P.M.—as from week commencing 5th September, 1955.
(4) Mondays, A.M., and Tuesdays, A.M.—as from week commencing 5th September, 1955.

The appointments are for a first period of 12 months; remuneration to be at the rate of £175 p.a.—i.e., graded General Practitioner.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, by 15th June, 1955.

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified registered practitioners for the following posts:—

(*a*) RESIDENT ANÆSTHETIST (graded House Officer) for a first period of 6 months, with effect from 10th August, 1955.

(*b*) ANÆSTHETIST (graded Senior House Officer); this appointment is non-resident but the successful candidate will be required to reside in the neighbourhood of the Hospital; the appointment is for a first period of 6 months, with effect from 8th September, 1955, the holder being eligible for reappointment for further periods of 6 months, to a maximum of 2 years.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, by 25th June, 1955.

ST. JAMES' HOSPITAL, Balham, S.W.12. South West METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (E.N.T.), resident.

Application forms (send stamped addressed foolscap envelope) obtainable from Group Secretary, Wandsworth Hospital Group, at above address, to be completed and returned by 25th June.

ST. JAMES' HOSPITAL, Balham, S.W.12. Locum REGISTRAR in Pathology required 20th June–9th July.

Applications, giving full details and names of 2 referees, to Group Secretary at above address, immediately.

ST. ANDREW'S HOSPITAL, Bow, E.3. Applications are invited for the appointment of HOUSE SURGEON (recognised for F.R.C.S. and Pre-registration Service), vacant on 10th July, 1955.

Applications, stating age and qualifications, should be sent immediately to the Medical Superintendent, St. Andrew's Hospital, Bow, E.3.

ST. THOMAS'S HOSPITAL, London, S.E.1. Surgical REGISTRAR. Duties in casualty in the first instance. The post is interchangeable with the other Surgical Registrars in the Hospital and the Group.

Applications, including names and addresses of 2 referees, to the Clerk of the Governors by 11th June.

ST. THOMAS'S HOSPITAL, London, S.E.1. Registrar to the Cardiac Department for 1 year in the first instant.

Applications, including names and addresses of 2 referees, to the Clerk of the Governors by 12th June, 1955.

ST. THOMAS'S HOSPITAL, London, S.E.1. Senior RESIDENT ANÆSTHETIST (Senior House Officer grade) for 6 months from 15th August, renewable for a further 6 months.

Applications, including names and addresses of 2 referees, to the Clerk of the Governors by 11th June.

WANSTEAD HOSPITAL, Hermon Hill, London, E.11. (191 Beds.) HOUSE SURGEON required. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WEST HAM GROUP HOSPITAL MANAGEMENT COMMITTEE, Stratford, E.15. ANÆSTHETISTS (resident; Senior House Officer grade) required for 12 months commencing 16th July, 1955. 6 months duty at Queen Mary's Hospital for the East End, followed by 6 months at East Ham Memorial Hospital or vice versa. Combined post recognised for F.F.A.R.C.S.

Applications, with names of 3 referees, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, by 11th June, 1955.

WEST LONDON HOSPITAL, Hammersmith-road, W.6. Applications invited for following posts :—

2 RESIDENT CASUALTY OFFICERS (Senior House Officer grading), 1 from 26th July, 1 from 11th August.

RESIDENT SENIOR HOUSE OFFICER (anæsthetics), 1st September.

RESIDENT HOUSE OFFICER to special departments (pædiatrics, E.N.T., ophthalmology, dental, dermatology), 1st July.

2 RESIDENT HOUSE PHYSICIANS (general medicine), 1 from 10th July, 1 from 15th July. Pre-registration candidates considered.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary by 11th June.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the appointment of a REGISTRAR in Obstetrics and Gynæcology with duties in the Aberdeen Royal Infirmary and Associated Hospitals. The post is a whole-time one and is resident. Salary and conditions of service are in accordance with the terms issued by the Department of Health for Scotland.

Applications, giving details of qualifications and experience, with the names of 2 referees, should be lodged with the Secretary, Aberdeen General Hospitals, P.O. Box No. 92, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

ALTON GENERAL HOSPITAL. (131 Beds.) Winchester GROUP OF HOSPITALS. HOUSE SURGEON (Senior House Officer grade) required to assist in steadily expanding surgical work, including casualty at this Hospital which is being developed. Post vacant 23rd June.

Applications, with copies of 2 testimonials, to be sent to the Group Secretary, Royal Hampshire County Hospital, Winchester.

BANGOR. CAERNARVON AND ANGLESEY GENERAL HOSPITAL. CAERNARVON AND ANGLESEY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON. The appointment is for a period of 6 months. Salary and conditions of service in accordance with those approved by the Ministry of Health.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, to be forwarded to the Group Secretary, Plas Gwyn, Ffriddoedd-road, Bangor, within 10 days of the appearance of this advertisement.

BARNSTAPLE. NORTH DEVON INFIRMARY. (110 Beds.) HOUSE SURGEON (pre-registration). Post vacant mid-July.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BATLEY. THE GENERAL HOSPITAL, Carlinghow Hill. DEWSBURY, BATLEY AND MIRFIELD HOSPITAL MANAGEMENT COMMITTEE.

HOUSE SURGEON (surgery and E.N.T.).

HOUSE SURGEON (orthopædics and ophthalmology).

Both these appointments are pre-registration posts, but consideration will be given to Locum applications, and the posts can be taken up immediately.

Applications in writing, enclosing testimonials, should be sent to the Administrative Officer, at the Hospital.

BEBINGTON, CHESHIRE. CLATTERBRIDGE HOSPITAL. (730 Beds.) **CENTRAL WIRRAL GROUP.** HOUSE OFFICER (pædiatrics), for unit of 82 beds. Recognised pre-registration and D.C.H. 6 months commencing 1st September, 1955. Salary according to previous posts held.

Application forms from the Hospital Secretary, to be returned by 18th June, 1955.

BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for a post of ANÆSTHETIST, of Junior Hospital Medical Officer status, for services within the Barrow and Furness Hospital Group. Resident or non-resident. Post tenable for 4 years, but may be renewed at end of period.

Applications to Group Secretary, 52, Paradise-street, Barrow-in-Furness.

BEDFORD GENERAL HOSPITAL. (437 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required at above Hospital. Post vacant 29th July.

Application form obtainable from, and returnable to, Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by 18th June, 1955.

BEDFORD GENERAL HOSPITAL. (437 Beds.) Pre-registration HOUSE SURGEONS required. The appointments offer exceptional opportunities for general experience in busy acute Surgical Units.

Applications, stating age, nationality, qualifications, previous appointments (if any), together with copies of 2 recent testimonials, should be forwarded to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (437 Beds.) 2 resident Pre-registration HOUSE PHYSICIANS required end of June.

Applications, stating age, nationality, qualifications, previous appointments (if any), together with copies of 2 recent testimonials, should be forwarded to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by not later than 11th June, 1955.

BIRKENHEAD. CHILDREN'S HOSPITAL. Birkenhead HOSPITAL MANAGEMENT COMMITTEE. Locum SENIOR HOUSE OFFICER in Pædiatrics from 22nd July–8th August inclusive. £14 10s. per week.

Apply Secretary above Committee, St. James' Hospital, Birkenhead, with names of 2 referees or copies of 2 testimonials.

BIRMINGHAM ACCIDENT HOSPITAL, Birmingham, 15. (215 Beds.) RESIDENT HOUSE SURGEON, vacant June. Recognised for F.R.C.S. Appointment for 6 months in General Accident Service and (at applicant's request) includes period in 32-Bedded Burns Unit.

Apply Administrator.

BIRMINGHAM AND MIDLAND EAR AND THROAT HOSPITAL, Edmund-street, **BIRMINGHAM** 3. Required, SENIOR HOUSE OFFICER or HOUSE OFFICER (including pre-registration), according to experience.

Detailed applications, with copies of 2 recent testimonials, to the Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 9. LITTLE BROMWICH HOSPITAL. RESIDENT MEDICAL OFFICER in Infectious Diseases (Junior Hospital Medical Officer or Senior House Officer grade according to experience). Hospital serves wide area and gives opportunities for study of infectious diseases. Part of Hospital is being developed as General Hospital, where further experience can be gained.

Apply Physician-Superintendent.

BIRMINGHAM, 9. LITTLE BROMWICH HOSPITAL. HOUSE PHYSICIAN (Male/Female), vacant 1st July, 1955. Recognised as pre-registration appointment.

Apply Physician-Superintendent, with copies of 2 testimonials or names of referees.

BIRMINGHAM, 9. LITTLE BROMWICH HOSPITAL. PÆDIATRIC HOUSE PHYSICIAN (Male/Female), vacant 1st August, 1955. Recognised for D.C.H., includes duties in infectious diseases wards and at Neonatal Department and clinics.

Apply Physician-Superintendent.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Birmingham (Dudley Road) Hospital Management Committee, Dudley Road Hospital, Birmingham, 18**

OPHTHALMOLOGIST (Registrar) for Birmingham Eye Hospital Research Department, preferably with experience in physiology and clinic research. Opportunity to work for higher degree.

(2) **Birmingham (Selly Oak) Hospital Management Committee, Oak Tree-lane, Birmingham, 29**

(*a*) Whole-time REGISTRAR for E.N.T. Department (39 Beds) at Selly Oak Hospital (1090 Beds). Non-resident. Experience specialty and higher qualification an advantage.

(*b*) REGISTRAR in Pathology for Birmingham Accident Hospital, Birmingham, 15. Previous experience essential. Higher qualification desirable. Experience available in haematology, including blood-transfusion, bacteriology, biochemistry and morbid anatomy. Details from Consultant Pathologist.

(*c*) REGISTRAR in General Surgery for duties at Little Bromwich and Solihull Hospitals. Higher qualification desirable. Resident at Little Bromwich Hospital.

(3) **Walsall Hospital Management Committee, Walsall General (Sister Dora Hospital), Wednesbury-road, Walsall**

REGISTRAR in General Surgery for General Hospital, Walsall (181 Beds). Experience specialty essential. Married quarters available.

Application forms from Group Secretaries, to be returned before 20th June, 1955. Candidates may visit hospitals.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. GENERAL HOSPITAL. Applications are invited for the post of MEDICAL REGISTRAR (Registrar grade). The post is tenable for 1 year in the first instance. Candidates must have held a resident appointment and should have the M.R.C.P. (London).

Forms of application may be obtained from, and should be returned not later than 11th June, 1955, to the Secretary, The United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. GENERAL HOSPITAL. Applications are invited for the post of CASUALTY SURGICAL REGISTRAR (resident), Registrar grade, for duty in the Casualty and Traumatic Department, with opportunities for experience in general surgery. The post is recognised by the Royal College of Surgeons for the purpose of the F.R.C.S. examination and is tenable for 1 year in the first instance. Candidates must be registered medical practitioners and have held a resident appointment.

Forms of application may be obtained from, and should be returned not later than 11th June, 1955, to, the Secretary, The United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE BIRMINGHAM MATERNITY HOSPITAL. Applications are invited from registered medical practitioners for the post of RESIDENT OBSTETRIC HOUSE SURGEON, vacant 1st September, 1955. The appointment is recognised for the M.R.C.O.G.

Application forms obtainable from the House Governor, the Birmingham and Midland Hospitals for Women, Showell Green-lane, Sparkhill, Birmingham, 11, to be returned not later than 2nd July, 1955. G. A. PHALP, Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the joint post of HOUSE OFFICER (casualty) AND HOUSE PHYSICIAN, vacant on 7th July, 1955, for 6 months. The duties will include normal casualty work and inpatient responsibility for a number of beds. Pre-registration candidates are eligible to apply.

Forms of application may be obtained from the House Governor, and should be returned not later than 18th June, 1955.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM (SANATORIA) GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at West Heath Hospital, Rednal-road, Birmingham, 31 (210 Beds). The successful applicant will reside at the above Hospital (accommodation for single person only), and will be required to undertake duties at the Birmingham Chest Clinic, Great Charles-street, Birmingham, 3.

Applications, stating age, qualifications, training and experience, together with copies of 3 recent testimonials, should be addressed to the Secretary, Birmingham (Sanatoria) Group Hospital Management Committee, Yardley Green Hospital, Birmingham, 9, as soon as possible.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (1059 Beds.)

HOUSE PHYSICIANS. Available July and August.

HOUSE PHYSICIAN (pædiatrics). Recognised for D.C.H. Some duties at Moseley Hall Hospital for Children. Available July.

HOUSE SURGEONS. Recognised for F.R.C.S. Available July.

HOUSE SURGEONS (gynæcology and obstetrics). Recognised for M.R.C.O.G. Available July and August.

All posts are recognised for Pre-registration Service. Salary in accordance with national scale for House Officers and appointments tenable for 6 months.

Apply Medical Superintendent, giving qualifications, age and experience, and enclosing copies of 3 testimonials.

BIRMINGHAM. ST. CHAD'S HOSPITAL, Hagley-road, BIRMINGHAM, 16. HOUSE SURGEON required from 7th July, 1955. Post recognised for Pre-registration Service.

Detailed applications, with recent testimonials, to Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. ST. CHAD'S HOSPITAL, Hagley-road, BIRMINGHAM, 16. OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON required from 7th July, 1955. Post recognised for Pre-registration Service and for Diploma of R.C.O.G.

Detailed applications, with recent testimonials, to Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. THE SKIN HOSPITAL, INPATIENTS' DEPARTMENT, George-road, BIRMINGHAM, 15. SENIOR HOUSE OFFICER or HOUSE OFFICER according to experience (required mid-August). Modern well-equipped Inpatients' Department, providing facilities for study of skin diseases. Required to assist Consultant at outpatient clinics.

Applications, with copies of 2 recent testimonials, to Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 9. YARDLEY GREEN HOSPITAL. THORACIC SURGICAL UNIT (66 Beds). Vacancies exist for 2 SENIOR HOUSE OFFICERS, 1 immediately and 1 on 20th June, 1955. No previous experience in thoracic surgery necessary.

Applications, stating age, qualifications, training and experience, together with names of 3 referees, should be addressed to the Group Secretary, Yardley Green Hospital, Birmingham, 9.

BISHOP'S STORTFORD, HERTFORDSHIRE. HAYMEADS HOSPITAL. (Midway between London and Cambridge. Main Line Railway from Liverpool Street.) Applications are invited for the post of HOUSE OFFICER (surgical), first or second post held. Pre-registration post. Salary £425–£525 p.a., less £125 in respect of residential emoluments. Appointment to commence as soon as possible.

Applications, stating age, nationality, qualifications and experience, with copies of recent testimonials or names of referees, to the Hospital Secretary.

BLACKPOOL. VICTORIA HOSPITAL. (348 Beds.) RESIDENT HOUSE SURGEON (Surgical Department). Post now vacant. Pre-registration post. Recognised for F.R.C.S. examination. This is a busy general hospital with a large Outpatient Department and the post offers excellent opportunities for general experience under Consultant Surgeons.

Applications, with names and addresses of referees, should be sent to the Hospital Secretary.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following posts which fall vacant early in July, 1955 :—

Victoria Hospital, Accrington (112 acute beds)
HOUSE PHYSICIAN.

Queen's Park Hospital, Blackburn (644 general)
2 HOUSE PHYSICIANS.

Royal Infirmary, Blackburn (262 acute beds)
HOUSE PHYSICIAN and HOUSE SURGEON.

All House Officer posts recognised for pre-registration purposes. House Surgeon post recognised for F.R.C.S.

Apply to Secretary of the Committee, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

BOLTON DISTRICT GENERAL HOSPITAL. (Townleys BRANCH PSYCHIATRIC UNIT.) BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in Psychiatry (resident). Unit is attached to a General Hospital. Consultant Psychiatrist in charge. All forms of modern treatment in use. Post offers excellent facilities for anyone desiring to specialise in psychiatry and attend D.P.M. course at Manchester University. Hospital also recognised for London and Irish D.P.M. Outpatient clinics in existence. Post now vacant and tenable for 12 months.

Applications, stating age, nationality, qualifications, experience, and the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of GENERAL HOUSE SURGEON. The appointment is recognised for the F.R.C.S. examination and for pre-registration purposes and becomes vacant on 16th June.

Applications to the Deputy Hospital Secretary at the Hospital.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE SURGEON for general and thoracic surgery. The appointment is recognised for the F.R.C.S. examination and for pre-registration purposes and becomes vacant on 17th June.

Applications to the Deputy Hospital Secretary at the Hospital.

BOURNEMOUTH. ST. ANN'S HOSPITAL, Canford CLIFFS. (NEUROSIS HOSPITAL.) GROUP NO. 52 HOSPITAL MANAGEMENT COMMITTEE. Locum Tenens JUNIOR HOSPITAL MEDICAL OFFICER required. St. Ann's is a 68-Bedded Hospital for the treatment of psychiatric patients without legal formalities. Salary £17 10s. per week—conditions of service are in accordance with Whitley Council terms and conditions for hospital medical staff. A small flat suitable for 1 or 2 persons is available if desired.

Form of application can be obtained from the Group Secretary, Holloway Sanatorium, Virginia Water, Surrey.

BRADFORD A AND B HOSPITAL MANAGEMENT COMMITTEES. JUNIOR HOUSE OFFICER required for newly formed active Geriatric Admission Unit. The major portion of the duties will be carried out at St. Luke's Hospital, Bradford.

Applications, stating age, nationality, qualifications and experience, and copies of testimonials, to the Secretary, Royal Infirmary, Bradford.

BRADFORD ROYAL INFIRMARY. Resident Senior HOUSE OFFICER (medicine and pathology). This is a post of a supervisory nature in 2 acute general medical wards with a Junior House Officer combined with duties in the Department of Pathology consisting of general hæmatology and post-mortem work. Vacant 23rd June. Salary £745 p.a., less £150 p.a.

Applications, stating age, nationality, qualifications, and experience with copy testimonials, to Secretary.

BRADFORD. ST. LUKE'S HOSPITAL AND WOODLANDS HOSPITAL, RAWDON. SENIOR HOUSE OFFICER to Orthopædic Unit vacant now. Salary £745 p.a., less £150 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience with copy testimonials, to the Secretary, Bradford Royal Infirmary.

BRADFORD, YORKSHIRE. THE ROYAL EYE AND EAR HOSPITAL. (105 Beds.) SENIOR HOUSE OFFICER required for E.N.T. Department of 56 Beds. Recognised for D.L.O. and F.R.C.S. Salary £745 p.a., less £150 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRIGHTON. NEW SUSSEX HOSPITAL FOR WOMEN, Windlesham-road. HOUSE PHYSICIAN (Female) for 6 months from 9th July. Duties include work in Gynæcological Department. Pre-registration candidates may apply.

Applications, stating age, nationality, qualifications and experience, together with copies of recent testimonials, to the Administrative Officer by 16th June.

BURTON-ON-TRENT GENERAL HOSPITAL. (251 Beds.) RESIDENT HOUSE SURGEON required for Orthopædic Unit. Hospital recognised for F.R.C.S.

Applications to the Group Secretary.

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards from registered medical practitioners for the joint appointment of REGISTRAR in General Surgery. The appointment will be held for 1 year in the first instance and be renewable for a further year. The successful candidate will be appointed to work for the first year mainly at the South Devon and East Cornwall Hospital, Plymouth, but may be required to undertake duties in other hospitals in the Group.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 17th June, 1955.

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards from registered medical practitioners for the joint appointment of REGISTRAR in Anæsthetics. The appointment will be held for 1 year in the first instance, and be renewable for a further year. The successful candidate will be appointed to work for the first year mainly at Southmead Hospital, Bristol, but may also be required to undertake duties at other hospitals in the Group.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 25th June, 1955.

BRISTOL MENTAL HOSPITAL MANAGEMENT COMMITTEE. Applications invited from registered medical practitioners for JUNIOR HOSPITAL MEDICAL OFFICER post at Fishponds Hospital. Salary and conditions according to Health Service scale £775–£1075. Post offers wide scope in psychiatry and its special branches including Neurosis Centre and Day Hospital. Holder will have opportunity of studying, and gaining experience, for Diploma in Psychological Medicine. Modern house available. Board-residence can be provided for single officer.

Applications, with names of 3 referees, should be sent to Medical Superintendent, Barrow Hospital, Barrow Gurney, near Bristol.

BROMSGROVE GENERAL HOSPITAL. (423 Beds.) HOUSE SURGEON (pre-registration) required at the above Hospital. Salary £425–£525 according to experience. Post vacant in July.

Applications, with the names of 3 referees, to the Hospital Secretary.

BROMSGROVE GENERAL HOSPITAL. (423 Beds.) HOUSE PHYSICIAN (pre-registration) required at the above Hospital. Salary £425–£525 according to experience. Post vacant in July.

Applications, with the names of 3 referees, to the Hospital Secretary.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE, BURY GENERAL HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER or REGISTRAR in Anæsthetics. The post is based on Bury General Hospital, but will include duties at other hospitals in the Group, and provides wide experience. The anæsthetic staff comprises, in addition, a Consultant and a Senior Hospital Medical Officer.

Apply, stating age, qualifications, experience, and names of 2 referees, to H. WILKINSON, Group Secretary.

Bury General Hospital, Walmersley-road, Bury, Lancs.

CAERPHILLY DISTRICT MINERS' HOSPITAL. (6 miles from Cardiff.) **RHYMNEY AND SIRHOWY VALLEYS HOSPITAL MANAGEMENT COMMITTEE.** SENIOR HOUSE OFFICER (general surgery) required at above Hospital: 144 Beds for general surgery, orthopædics, E.N.T., ophthalmology and gynæcology; 26 Beds for general medicine. Busy Outpatients, Radiology and Pathology Departments. Married quarters available.

Apply, with full particulars, to the Group Secretary, Hospital Management Committee, St. Martin's-road, Caerphilly, Glam.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House OFFICER (E.N.T. Department) for 6 months from 25th July. Recognised Pre-registration Service (surgical).

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to the Secretary by 11th June, Interviews 20th June.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House SURGEON to the Orthopædic Department for 6 months from 1st August, 1955. Recognised Pre-registration Service.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to the Secretary by 18th June. Interviews 21st June.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) E.N.T. AND EYE DEPARTMENTS. SENIOR HOUSE OFFICER. Salary £745 p.a. Post vacant early June, 1955. Approved for F.R.C.S. and special diplomas.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) The post of GENERAL SURGICAL AND ORTHOPÆDIC HOUSE SURGEON, which is recognised for the F.R.C.S. Diploma, is now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court Annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months appointment. Post now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARSHALTON. QUEEN MARY'S HOSPITAL FOR CHILDREN. (Acute Children's Hospital of 840 Beds.) RESIDENT HOUSE SURGEON required for 6 months. Applicants must have completed 12 months Pre-registration Service.

Applications, stating age, qualifications and experience, together with 3 recent testimonials, should be sent to the Group Secretary by 11th June, 1955.

CARDIFF. ST. DAVID'S HOSPITAL. (656 Beds.) CARDIFF HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (resident) required immediately in acute medical wards to work under direction of Consultants.

Application form from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. LLANDOUGH HOSPITAL. Applications are invited for the post of SENIOR REGISTRAR (fifth year) to the Miners' Chest Diseases Treatment Centre. The appointment will be for a period of 1 year. This Centre is closely associated with the adjoining Pneumoconiosis Research Unit of the Medical Research Council.

Application forms can be obtained from the Secretary, United Cardiff Hospitals, Cardiff Royal Infirmary.

CASTLEFORD, NORMANTON AND DISTRICT HOSPITAL. RESIDENT SURGICAL OFFICER (graded Senior House Officer). Married accommodation available.

Applications to Secretary, Great Northern House, Salterrow, Pontefract, Yorks.

CHELMSFORD AND ESSEX HOSPITAL. (162 Beds.) Locum Tenens REGISTRAR in Surgery required for the period 5th August–21st August.

Applications to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. (162 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON (pre-registration post). The post will become vacant on 13th July and offers good surgical experience and is recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL, London-road, CHELMSFORD. (162 Beds.) Applications are invited for the post of HOUSE PHYSICIAN (pre-registration post), to work in the general medical wards of the above Hospital. Duties will commence 9th July.

Applications, with copies of 2 recent testimonials, should be sent to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELTENHAM GENERAL EYE AND CHILDREN'S HOSPITAL. (CHILDREN'S DEPARTMENT.) Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade) for the Children's Department (54 Beds). The appointment, which is recognised for candidates entering for the D.C.H., offers scope for wide experience in all Departments of Pædiatrics, surgical cases, and attendance at Outpatient Departments at the General Hospital. Previous hospital experience in pædiatrics is desirable.

Applications, together with copies of 3 testimonials, should be addressed to S. T. DAVIS, Group Secretary.

General Hospital, Cheltenham.

CHEPSTOW, MONMOUTHSHIRE. PLASTIC SURGERY JAW INJURIES AND BURNS CENTRE, ST. LAWRENCE HOSPITAL. (100 plastic surgery, 50 orthopædic beds.) SENIOR HOUSE OFFICER in Plastic Surgery required. Previous experience in specialty not essential. The successful candidate will receive a thorough training in plastic surgery and burns. Hospital intakes from most of Wales and provides extensive experience. There is another Senior House Officer in plastic surgery and also a Senior House Officer in orthopædics. Salary £745, less £150 board-residence.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

CHESTER ROYAL INFIRMARY. Applications are invited for 2 RESIDENT HOUSE SURGEON (general) posts, which are vacant now. Both posts are recognised for the F.R.C.S. and Pre-registration Service.

Applications, giving full details, together with the names and addresses of 2 referees, should be forwarded to the Group Secretary, XIII Chester and District Hospital Management Committee, 5, King's-buildings, Chester.

COLCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for :—

Essex County Hospital, Colchester (188 Beds)

HOUSE PHYSICIAN (first, second, third, or pre-registration post), tenable for 6 months.

Black Notley Hospital, Braintree, and Essex County Hospital, Colchester

HOUSE SURGEON (first, second, third, or pre-registration post), tenable for 6 months. Duties to include work in general surgical and gynæcological wards. Recognised for F.R.C.S.

Applications, with copies of 3 testimonials, to Group Secretary, 14, Pope's-lane, Colchester, Essex.

CROYDON GENERAL HOSPITAL. (200 Beds.) Locum Tenens SURGICAL REGISTRAR required 13th–24th June inclusive.

Apply, giving particulars of qualifications and experience, to—
GEORGE A. PAINES, Group Secretary,
Hospital Management Committee.

General Hospital, London-road, Croydon.

CROYDON GENERAL HOSPITAL. (200 Beds.) House SURGEON (pre-registration) required as from 30th June for period of 6 months. Post recognised for F.R.C.S.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, London-road, Croydon, to be returned immediately.

CROYDON GENERAL HOSPITAL. (200 Beds.) Locum Tenens CASUALTY OFFICER (Senior House Officer grade) for period 13th–26th June inclusive.

Applications, giving full particulars, to—
GEORGE A. PAINES, Group Secretary,
Hospital Management Committee.

General Hospital, London-road, Croydon.

CROYDON. MAYDAY HOSPITAL. (618 Beds.) House SURGEON (pre-registration post) commencing 24th June, 1955, for period of 6 months. Post recognised for F.R.C.S. Preference given to candidates who have held previous House Officer posts.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, London-road, Croydon, to be returned immediately.

CROYDON. MAYDAY HOSPITAL. (618 Beds.) Locum Tenens ORTHOPÆDIC REGISTRAR required 8th–22nd June inclusive. Experience in orthopædics essential.

Apply, giving particulars of age, qualifications and experience, to— GEORGE A. PAINES, Group Secretary, Hospital Management Committee.

General Hospital, London-road, Croydon.

CROYDON. MAYDAY HOSPITAL. (618 Beds.) Locum Tenens SENIOR CASUALTY OFFICER (Junior Hospital Medical Officer grading) for period 4th July–4th August inclusive.

Applications, with full particulars, to— GEORGE A. PAINES, Group Secretary, Hospital Management Committee.

General Hospital, London-road, Croydon.

CROYDON. MAYDAY HOSPITAL. (618 Beds.) Croydon GROUP HOSPITAL MANAGEMENT COMMITTEE. JUNIOR CASUALTY OFFICER (Senior House Officer grade). Applications are invited for post which is vacant on 24th June. Recognised for Final F.R.C.S. examination. Particularly good for gaining experience in orthopædics and fracture work.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, London-road, Croydon.

CROYDON. MAYDAY HOSPITAL. (618 Beds.) House SURGEON (resident) for Fracture and Orthopædic Unit required on 14th June for 6 months. Post approved for pre-registration candidates.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, London-road, Croydon, to be returned immediately.

CROYDON. QUEEN'S HOSPITAL. (450 Beds.) Geriatric UNIT. CROYDON GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (resident). Post vacant as from 1st July.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, London-road, Croydon, to be returned within 14 days.

COTTINGHAM. CASTLE HILL HOSPITAL. Hull B HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER to work in Major Thoracic Surgery Unit. Residential accommodation available. The Unit has 50 Beds for all types of thoracic surgery, including tuberculous and non-tuberculous, œsophageal, and cardiac.

Applications, with names of referees, to Group Secretary, De la Pole Hospital, Willerby, East Yorkshire.

COTTINGHAM. CASTLE HILL SANATORIUM (221 Beds), AND RAYWELL SANATORIUM, near COTTINGHAM (48 Beds). Locum Tenens SENIOR HOUSE OFFICER to work under supervision of Consultant Chest Physician in Group Sanatoria with Major Thoracic Surgery Unit and Mass Radiography and laboratory facilities.

Application forms from Group Secretary, Hull B Hospital Management Committee, De la Pole Hospital, Willerby, E. Yorkshire.

DAGENHAM HOSPITAL, Rainham-road South, Dagenham. There is a vacancy for the position of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade) at the above Hospital of 155 Beds for pulmonary tuberculosis —all stages. Salary in accordance with the national scale (£775–£50–£1075 p.a.), less residential charges. Further particulars available from the Physician-Superintendent.

Applications, stating age, qualifications, and previous experience, together with recent testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement. H. F. HARRIS, Secretary,

Ilford and Barking Group Hospital Management Committee.

King George Hospital, Ilford.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (396 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (dermatology) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 13th June, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER (clinical pathology). Post vacant now and tenable for 1 year in the first instance.

Applications, stating full details, with copies of 2 recent testimonials, should be sent as soon as possible to Secretary at the Infirmary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. House SURGEON (pre-registration), general surgery, vacant 9th July.

Apply, stating full details with copies of 2 testimonials, to Hospital Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Senior HOUSE OFFICER (general surgery), vacant 1st July.

Apply, stating full details with copies of 2 testimonials, to Hospital Secretary.

DEWSBURY. THE GENERAL HOSPITAL, Moorlands-road. DEWSBURY, BATLEY AND MIRFIELD HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (surgery and casualty) required immediately.

Applications, stating age, qualifications, present and previous appointments, together with the names of 2 referees, should be sent to the Administrative Officer at the Hospital.

DOUGLAS. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications are invited for the post of CASUALTY OFFICER, with anæsthetic duties. House Officer grade post, recognised for Pre-registration Service. Post now vacant. 4 residents on staff. Salary £425/£475, with £125 deduction for residential emoluments. Appointment for 6 months.

Applications, enclosing copies of 2 recent testimonials, to the Secretary, Noble's Hospital, Douglas, Isle of Man.

DONCASTER HOSPITAL MANAGEMENT COMMITTEE. HAMILTON ANNEXE, WESTERN HOSPITAL. (Recognised under the Regulations for the D.Obst.R.C.O.G. and M.R.C.O.G. (obstetrical experience) and approved for Pre-registration Service under the Medical Act, 1950.) Applications are invited for the post of OBSTETRICAL HOUSE OFFICER (Senior House Officer or pre-registration post), vacant middle of July.

Applications should be forwarded to the Secretary to the Committee at Doncaster Royal Infirmary by 25th June.

DONCASTER ROYAL INFIRMARY. (330 Beds.) DONCASTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE PHYSICIAN, vacant middle of July. Approved as pre-registration post.

Applications to the Secretary to the Committee, at the Doncaster Royal Infirmary.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Corbett Hospital, Stourbridge (106 Beds)

SENIOR HOUSE OFFICER (casualty).

HOUSE OFFICER (surgical), pre-registration.

The Guest Hospital, Dudley (154 Beds)

SENIOR HOUSE OFFICER (casualty). Post recognised for F.R.C.S. examination.

HOUSE OFFICER (surgical), pre-registration. Post vacant June.

Wordsley Hospital, near Stourbridge (478 Beds)

SENIOR HOUSE OFFICER (anæsthetics). Resident. Previous experience house appointments essential. Experience available general surgery, gynæcology, orthopædics, plastic surgery unit.

HOUSE OFFICER (surgical) pre-registration.

HOUSE OFFICER (medical), pre-registration. Post vacant June.

Applications, stating age, experience, with copies of 3 recent testimonials, to Group Secretary, The Guest Hospital, Dudley, Worcs.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

(1) REGISTRARS in Psychiatry:—

(*a*) Fulbourn Hospital and Addenbrooke's Hospital, Cambridge. Joint appointment by Regional Hospital Board and Board of Governors of United Cambridge Hospitals. Trainee post which provides full facilities for clinical work with all types of patients and study for D.P.M. The successful candidate will work initially at Fulbourn Hospital and later also undertake duties at Addenbrooke's Hospital.

(*b*) Suffolk Mental Hospital Group—St. Clement's Hospital, Ipswich (450 Beds) and St. Audry's Hospital, Melton, near Woodbridge (1100 Beds), and associated general hospital outpatient clinics. There is a new Outpatient Department and Electro-encephalographic Department at St. Clement's Hospital. Accommodation available.

Candidates invited to visit hospitals by direct arrangement with appropriate Medical Superintendent.

(2) RADIOLOGICAL REGISTRAR at the Norfolk and Norwich Hospital (440 Beds). The department is the centre for Consultant Radiological Services to a large hospital group in Norwich, Gt. Yarmouth and Norfolk. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

(3) SURGICAL REGISTRAR, Great Yarmouth and Gorleston Hospital (Norfolk and Norwich Group). Post recognised for F.R.C.S. Candidates invited to visit Hospital by direct arrangement with Secretary-Superintendent at the Hospital.

All appointments for 1 year, renewable for second year.

Applications, stating age, experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 20th June, 1955.

EDINBURGH. CHALMERS HOSPITAL. Applications are invited from registered medical practitioners and pre-registration graduates for appointment of RESIDENT HOUSE PHYSICIAN for 6 months commencing 1st October, 1955. National Health Service scale.

Applications, stating age, qualifications, and experience, and names of 2 referees, to be sent within 14 days of appearance of this notice to Medical Superintendent, Edinburgh Central Hospitals, 18, Rillbank-terrace, Edinburgh, 9.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. Appointment of RESIDENT HOUSE SURGEON (third post), vacant immediately. Duties with General Surgical Unit which includes some orthopædics. 6 months appointment. Post recognised by the Royal College of Surgeons.

Applications, with the names and addresses of 2 referees, to the Secretary of the Management Committee.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE SURGEON (approved pre-registration), vacant 26th July, 1955. Duties with a general Surgical Unit doing some orthopædic work. Post recognised by the Royal College of Surgeons. 6 months appointment.

Applications, with the names and addresses of 2 referees, to the Secretary of the Management Committee.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from pre-registration and registered medical practitioners for the post of HOUSE SURGEON, vacant 11th June, 1955.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary immediately.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from pre-registration and registered medical practitioners for the appointment of HOUSE PHYSICIAN (general medicine and pædiatrics), vacant 14th July, 1955.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 11th June, 1955.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from pre-registration and registered medical practitioners for the appointment of HOUSE SURGEON (Obstetric and Gynæcological Department). This post is recognised for the M.R.C.O.G. examination, Gynæcology. Vacant 22nd July, 1955.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 11th June, 1955.

GLASGOW, N.1. STOBHILL GENERAL HOSPITAL. PSYCHIATRIC UNIT. HOUSE OFFICERS (resident), Male or Female, required 1st August, 1955. 180 Beds, 1500 admissions yearly, acute treatable cases. Unit recognised for D.P.M.

Apply to Medical Superintendent.

GLASGOW VICTORIA HOSPITALS BOARD OF MANAGEMENT. E.N.T.—SENIOR HOUSE OFFICER required (resident Mearnskirk Hospital, Newton Mearns) with duties at Mearnskirk Hospital and Victoria Infirmary, Glasgow.

Applications, with names of 3 referees, should be submitted to the Secretary, 24, St. Vincent-place, Glasgow, C.1.

GRANTHAM AND KESTEVEN GENERAL HOSPITAL. (117 Beds). RESIDENT HOUSE PHYSICIAN (Senior House Officer or pre-registration intern). General medical and pædiatric. Post vacant 6th August, 1955.

Applications, with full details, and names of 2 referees, to Secretary, 101, Manthorpe-road, Grantham.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (232 Beds.) SENIOR HOUSE OFFICER for ophthalmology and neurology required. Post is vacant on 1st July; resident accommodation is available. It is tenable for 6 months and renewable. Whitley Council terms, gross salary £745 p.a. Recognised for both F.R.C.S. and D.O. examinations.

Apply as soon as possible, with copies of 3 testimonials, to Hospital Secretary.

HASTINGS AND ST. LEONARDS. BUCHANAN HOSPITAL. (94 Beds.) SENIOR HOUSE OFFICER required for urology and children's surgery. Post vacant 9th July, is recognised for F.R.C.S., and may be tenable for 6 or 12 months. National scale of salary.

Apply to Hospital Administrator, giving 3 names for reference.

HASTINGS. ST. HELEN'S HOSPITAL. (489 Beds.) HOUSE PHYSICIAN required. Resident for pædiatrics and general medicine. Post vacant 5th July. National scale of salary.

Apply to Hospital Administrator.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. CASUALTY OFFICER (Junior Hospital Medical Officer) required. Post vacant now.

Applications, stating 2 names for reference, should be sent to the Hospital Secretary.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. Part-time OPHTHALMIC REGISTRAR (5 sessions per week required). General 705 Beds with ophthalmic beds, adults and children. Duties include work in Outpatient Department, wards and operating theatre. Candidates may visit Hospital by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, Uxbridge Group Hospital Management Committee, The Furze, Pield Heath-road, Uxbridge, Middlesex, by 20th June.

HITCHIN, HERTFORDSHIRE. LISTER HOSPITAL. Locum RESIDENT ANÆSTHETIST (Senior House Officer grade) required 11th June until 1st July, 1955.

Applications to Medical Administrator.

HITCHIN HOSPITALS, Hitchin, Hertfordshire. Resident SENIOR HOUSE OFFICER (casualty) for duty with the Accident Service and as Orthopædic House Surgeon, required for 6 months in the first instance on 1st July, 1955.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent immediately to the Medical Administrator, Lister Hospital, Hitchin.

HITCHIN HOSPITALS, Hitchin, Hertfordshire. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer), vacant 8th July, 1955. The post offers varied experience, and is recognised for the D.A. examination.

Applications, giving names of 2 referees, to be sent to the Medical Administrator, Lister Hospital, Hitchin immediately.

HORNCHURCH. ST. GEORGE'S HOSPITAL. Neurosis UNIT. Temporary Whole-time REGISTRAR in Psychiatry required until December, 1955. Mental hospital experience and knowledge of psychotherapeutic technique essential.

Applications, with names of 2 referees, to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, from whom further information can be obtained.

HOUNSLOW HOSPITAL, Staines-road, Hounslow, MIDDLESEX. (General Acute—81 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON recognised as pre-registration post. Appointment for 6 months.

Applications, stating qualifications and age, together with copies of up to 3 recent testimonials, or names for reference, to the Hospital Secretary.

HULL. MATERNITY HOSPITAL. (74 Beds.) Hull A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (obstetrics). This Maternity Hospital deals with all the emergency obstetrics in Hull and the East Riding of Yorkshire. The post offers excellent opportunities to gain experience in all branches of obstetrics. There are 3 House Officers on the establishment, and all these posts, together with that of the Senior House Officer, are recognised by the Royal College of Obstetricians and Gynæcologists for the Diploma and Membership examinations.

Apply, stating nationality, age, qualifications and experience, together with 3 testimonials, to the Secretary, Maternity Hospital, Hedon-road, Hull.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.
The Royal Infirmary, Huddersfield.

ILFORD AND BARKING GROUP HOSPITAL MANAGEMENT COMMITTEE. There is a vacancy for a SENIOR HOUSE OFFICER at the Ilford Isolation Hospital, Grove-road, Chadwell Heath (near London). Salary will be at the rate of £745 p.a., less emoluments. Small furnished bungalow available. This post is suitable for persons studying for the M.R.C.P. and D.C.H.

Applications, giving particulars of experience and qualifications and accompanied by copies of testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

King George Hospital, Ilford. H. F. HARRIS, Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Senior General Consulting Surgeon. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (356 Beds.) Applications are invited for the post of CASUALTY OFFICER (Senior House Officer grade). The post is recognised for the F.R.C.S. examination.

Applications, stating age and nationality, together with copies of recent testimonials, to Hospital Secretary.

IPSWICH. ST. HELEN'S HOSPITAL. (100 Beds for infectious diseases, pulmonary tuberculosis and long-stay orthopædics. The Area Chest Clinic is in the Hospital.) HOUSE PHYSICIAN required (post-registration appointment). Accommodation available for married man.

Applications to JOHN WILLIAMS, Group Secretary, Ipswich Group Hospital Management Committee, at the East Suffolk and Ipswich Hospital, Ipswich.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. Pre-registration HOUSE OFFICER for general surgery.

Applications, stating age, nationality, qualifications obtained with copies of up to 2 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, by 14th June, 1955.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL. (112 Beds.) HOUSE SURGEON (not pre-registration) required at the above Hospital. Post vacant in July.

Applications, with the names of 3 referees, to the Hospital Secretary.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL. (112 Beds.) HOUSE PHYSICIAN (pre-registration) required at the above Hospital. Salary £425–£525 according to experience. Post vacant mid-July.

Applications to the Hospital Secretary.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) CASUALTY OFFICER (Senior House Officer), Male or Female, resident or non-resident. Post vacant and suitable for one reading for higher qualifications, being recognised for F.R.C.S., affording contact with all Specialist Units in the Hospital.

Applications, with names and addresses of 3 referees, to Hospital Secretary.

LIVERPOOL (near). MOSS SIDE HOSPITAL, Maghull. (500 Beds for mental defectives exhibiting conduct disorders.) RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER or REGISTRAR. Hospital recognised for D.P.M. training. Facilities for study at Liverpool University.

Applications, naming 3 referees, to Medical Superintendent by 25th June, 1955. Candidates may visit Hospital by appointment.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for SENIOR REGISTRAR posts in :—

Anæsthetics.
Otorhinolaryngology.
Obstetrics and Gynæcology.

for the period 1st October, 1955–30th September, 1956. Annual reappointment thereafter until completion of the normal period of training will be considered without need for further application. Duties will initially be with The United Liverpool Hospitals.

Apply by 15th June, 1955, on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a temporary post of REGISTRAR in Radiology for the period to 30th September, 1955.

Apply as soon as possible on forms obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LEEDS, 6. MEANWOOD PARK HOSPITAL, Tongue-lane. (831 Beds, mental deficiency.) LEEDS (GROUP B) HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (resident), required. Single accommodation available.

Application forms and further particulars from Medical Superintendent.

LEEDS REGIONAL HOSPITAL BOARD. Short-term LOCUM TENENS appointments in the Registrar grade are constantly available at hospitals in the area of the Board, particularly in the specialties of anæsthetics, general medicine, general and orthopædic surgery, and psychiatry.

Interested practitioners, suitably experienced, should communicate with the Secretary, Joint Registrars Committee, Park-parade, Harrogate.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

General Medicine

(*a*) Duties at Harrogate General Hospital (253 Beds) and at Knaresborough Hospital with total of 90 acute medical beds. Also some duties in pædiatrics (20 Beds) (non-resident).

(*b*) Regional Rheumatism Centre, Harrogate (240 Beds) (9 sessions), and the Rheumatism Clinic, General Infirmary at Leeds (2 sessions). Resident at Royal Bath Hospital, Harrogate.

General Surgery

Clayton Hospital, Wakefield (75 general surgical beds). Duties are those of Resident Surgical Officer. Recognised for the F.R.C.S.

Infectious Diseases

Leeds Road Hospital, Bradford (120 I.D. beds) (resident).

Obstetrics and Gynæcology

Dewsbury, Batley and Mirfield Group (resident). Not yet recognised for M.R.C.O.G. but offers good experience. Aggregate of 90 obstetric and 30 gynæcology beds.

Ophthalmology

Duties in the Halifax and Bradford A Groups divided equally between Halifax Group (11 eye beds—1800 new outpatients annually) and Bradford A Group (34 eye beds—5800 new outpatients annually).

Otolaryngology

Huddersfield and Halifax Groups (non-resident). Successful candidate to reside in Huddersfield. Recognised for the Fellowship and the D.L.O.

Psychiatry

(*a*) Menston Hospital, near Leeds (2500 Beds) (resident).
(*b*) Naburn and Bootham Park Hospital, York (600 Beds).
(*c*) Clifton Hospital, York (1100 Beds).
(*d*) Oulton Hall Hospital, near Wakefield, and affiliated Mental Deficiency Colonies (aggregating 780 Beds) (non-resident).

Facilities for attendance at the Leeds University will be provided if the successful candidates are studying for the D.P.M.

Thoracic Surgery

Regional Thoracic Centre (56 Beds), Pinderfields General Hospital, Wakefield. Previous experience in thoracic work desirable. Unit under the charge of the Consultants to the Teaching Hospital and the post may, in future, be linked with the Unit at the General Infirmary at Leeds (resident—married quarters available).

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 16th June, 1955.

LEEDS. SEACROFT HOSPITAL, York-road. Senior HOUSE OFFICER for children's surgical and E.N.T. wards.

Applications to Chief Administrative Officer.

LEEDS, 9. ST. JAMES'S HOSPITAL. Leeds A Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Male and Female) for the appointment of SENIOR HOUSE OFFICER (orthopædics). The appointment, which is recognised by the Royal College of Surgeons for Fellowship, will be for a period of 1 year and the salary will be in accordance with the agreed terms and conditions of service of hospital medical and dental staffs, namely, £745 p.a. with an appropriate deduction in respect of board, lodgings, and other services provided.

Applications, stating age, qualifications, experience, &c., together with the names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.

Administrative Offices, St. James's Hospital, Leeds, 9.

LEEDS. THE UNITED LEEDS HOSPITALS. The MATERNITY HOSPITAL AT LEEDS. SENIOR HOUSE OFFICER required for the Pædiatric Unit for a period of 1 year. Post vacant 5th July, 1955. Successful applicant will work under the direction of the Professor of Pædiatrics and Child Health. Previous obstetrical experience would be an advantage but is not essential.

Applications, stating age, qualifications, previous posts with dates, and the names of 2 referees, should be sent to the Secretary to the Board at the General Infirmary at Leeds not later than 11th June, 1955.

LEICESTER (near). CARLTON HAYES MENTAL HOSPITAL, NARBOROUGH, LEICESTER. LEICESTER NO. 4 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (psychiatry) required for above Hospital (recognised for training for D.P.M.). Residential accommodation for single person (house may become available for married man).

Apply, giving age, qualifications, experience, and names of 3 referees, to Medical Superintendent immediately.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. Applications are invited for the post of SENIOR HOUSE OFFICER for Accident Service, including duties in the Hand Infection Unit. Vacant 1st August, 1955, and tenable for 1 year. Post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Secretary by 21st June, 1955.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. Applications are invited for the post of OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON, vacant 1st July, 1955, and tenable for 6 months. Recognised as pre-registration midwifery post.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Secretary by 21st June, 1955.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. Applications are invited for 2 posts of HOUSE SURGEON, vacant 1st July, 1955, and tenable for 6 months. Recognised as pre-registration posts and for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Secretary by 21st June, 1955.

LUTON AND DUNSTABLE HOSPITAL, Luton Bedfordshire. Applications are invited for 2 posts of HOUSE SURGEON for Accident Service including Orthopædic Department, vacant 1st July, 1955, and tenable for 6 months. Recognised as pre-registration posts and F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Secretary by 21st June, 1955.

LUTON MATERNITY HOSPITAL, Luton, Bedfordshire. RESIDENT OBSTETRIC HOUSE SURGEON required 1st July, 1955. The post, which is for 6 months in the first instance, is recognised for the D.Obst.R.C.O.G.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent by 21st June to the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds.

LLANELLY HOSPITAL, Llanelly, Carmarthenshire. GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the non-resident appointment of SENIOR HOUSE OFFICER in the Casualty Department of the above Hospital.

Full particulars, stating age, experience and qualifications, together with copies of 2 recent testimonials, should be forwarded to the Hospital Secretary.

LLANELLY HOSPITAL, Llanelly, Carmarthenshire. GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER for work in the Surgical Unit of 75 Beds. The post offers excellent experience in general surgery and the Hospital is recognised under the F.R.C.S. regulations. The successful candidate will also be expected to participate in the general work of the Hospital.

Full particulars, stating age, experience and qualifications, together with copies of 2 recent testimonials, should be forwarded to the Hospital Secretary.

MACCLESFIELD. PARKSIDE MENTAL HOSPITAL. (1678 Beds.) Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (psychiatric). Accommodation available for a married or a single person. The appointment in the first place will be for a period of 4 years but reapplication may be made by the successful applicant at the end of this period. All forms of modern treatment are in use and the Hospital is recognised by the Conjoint Board for the purposes of the D.P.M.

Applications, with the names of 3 referees, to be sent to the Medical Superintendent.

MANSFIELD. HARLOW WOOD ORTHOPÆDIC HOSPITAL. (328 Beds. Recognised for the F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL OFFICER (Registrar grade) required. Post becomes vacant 20th August. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 13th June, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

MEXBOROUGH. MONTAGU HOSPITAL AND ANNEXE. (168 Beds. and 30 Beds.) Locum SENIOR HOUSE OFFICER (surgery) required. Residential emoluments £140 p.a.

Applications to the Secretary, Hospital Management Committee, "Fern Bank," Doncaster-road, Rotherham.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. 2 REGISTRARS to the Department of Diagnostic Radiology, to commence as soon as possible. Whole-time appointments for 12 months, renewable. Applicants must possess the D.M.R.D. or its equivalent.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 17th June, 1955.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER in the Department of Anæsthetics, to commence as soon as possible. Resident appointment for 6 months, renewable for a second and possibly a third 6 months. Residence £155 p.a. Experience in the specialty essential.

Applications to be made on forms obtainable from the under signed and to be returned not later than 15th June, 1955.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of HOUSE OFFICER in Gynæcology. Applicants must have had previous hospital experience in medicine and surgery. The posts are recognised for the purposes of the M.R.C.O.G. examination. The appointment is for 6 months starting 1st July, 1955. Salary in accordance with national scale.

Application forms may be obtained from the undersigned and returned not later than 20th June, 1955.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. WEST MANCHESTER HOSPITAL. MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) SENIOR HOUSE OFFICER (non-tuberculous thoracic surgery) required for Manchester Regional Hospital Board Centre. Post now vacant.

Forms from Secretary.

MANCHESTER REGIONAL HOSPITAL BOARD. Senior REGISTRAR in General Medicine in the South Manchester Group of hospitals, mainly at Withington Hospital, Manchester. Arrangements may later be made for the person appointed to transfer to the United Manchester Hospitals (Manchester Royal Infirmary) for further experience and training.

Forms of application, obtainable from the Senior Administrative Medical Officer, Cheetwood-road, Manchester, 8, should be returned by 22nd June, 1955.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the non-resident post of REGISTRAR to the E.N.T. Department of the Stockport and Buxton Hospital Management Committee. The main duties will be at Stockport Infirmary with some duties at other hospitals in the Group.

Applications, stating age, experience and qualifications, together with the names of 2 referees, to be forwarded to the undersigned, immediately.

H. G. PRICE, Group Secretary.

59B, Shaw-heath, Stockport, Cheshire.

MANCHESTER REGIONAL HOSPITAL BOARD. Booth HALL CHILDREN'S HOSPITAL, BLACKLEY, MANCHESTER, 9. RESIDENT SURGICAL OFFICER (Registrar grade).

Applications, together with names of 2 referees, to be sent to Group Secretary (from whom further particulars may be obtained) as soon as possible.

MANCHESTER REGIONAL HOSPITAL BOARD. Sal-FORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of NON-RESIDENT REGISTRAR in Pathology at Hope Hospital, Salford, 6, vacant 1st July, 1955. The Hospital is recognised for the Diploma in Pathology and there are opportunities for study in all branches of clinical pathology.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, to be sent to the Group Secretary, Salford Royal Hospital, Salford, 3, before 12th June, 1955.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of RESIDENT REGISTRAR in Obstetrics and Gynæcology to the Wigan and Leigh Group of hospitals with main duties at Billinge Hospital, Orrell, near Wigan. The post is recognised for the M.R.C.O.G.

Applications, together with the names of 2 referees, to the Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan, to be received not later than 16th June, 1955.

MANCHESTER (near). ALTRINCHAM GENERAL HOSPITAL, ALTRINCHAM. (130 Beds.) NORTH AND MID CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (medical). This appointment, available June, is in a busy hospital and offers excellent opportunities of practical experience.

Applications, together with 2 recent testimonials, to Group Secretary, The Hospital, Sinderland-road, Altrincham, Cheshire.

MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the West Kent General Hospital, and the Kent County Ophthalmic and Aural Hospital, Maidstone (total beds 254). The post, which is of Senior House Officer grade, will be vacant on 1st July, 1955, and carries a salary of £745 a year, less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A.R.C.S. examination.

Applications, stating age, nationality, qualifications, and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, West Kent General Hospital, Maidstone.

MOTHERWELL, HAMILTON AND DISTRICT HOS-PITALS BOARD OF MANAGEMENT. COUNTY HOSPITAL, STONEHOUSE. (500 Beds.) As from 1st August, 1955, the following vacancies will be available for HOUSE OFFICERS :—

1 Surgical.
1 Medical.
1 Gynæcology and Specialties.
2 Orthopædic.

These appointments are approved as pre-registration posts.

Applications to Medical Superintendent, County Hospital, Stonehouse, Lanarkshire.

NORTHAMPTON (near). CREATON SANATORIUM. Applications are invited for the post of HOUSE OFFICER, which is recognised as a pre-registration medical appointment. The post is non-resident, but local accommodation is available. The Sanatorium has 140 Beds and is for the treatment of both pulmonary and non-pulmonary tuberculosis, and has a new Thoracic Unit.

Applications, stating age, experience, and qualifications, together with names and addresses of 2 referees, should be sent to the Secretary of the Northampton and District Hospital Management Committee, General Hospital, Northampton.

NOTTINGHAM. HEATHFIELD HOSPITAL (Infectious Diseases), Hucknall-road, NOTTINGHAM. Resident Locum MEDICAL OFFICER (Male or Female) required for holiday period of 8 weeks (July and August). Junior Hospital Medical Officer rate £17 10s. per week, less residential emoluments. Previous fever experience not essential.

Applications, with copies of 2 recent testimonials, as soon as possible to Physician-Superintendent.

NOTTINGHAM. HIGHBURY HOSPITAL. Applications are invited from fully qualified medical practitioners for the post of SENIOR HOUSE OFFICER in the Obstetrical and Gynæcological Department (42 obstetrical beds, 11 gynæcological beds, and a small block for puerperal pyrexia). The appointment is for a period of 12 months to commence 14th July. The Hospital is recognised for the M.R.C.O.G. (obstetrics only). Previous obstetric experience required.

Applications, stating age, qualifications, and experience, also nationality, together with copies of recent testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners (Male or Female) for the post of RESIDENT SENIOR ANÆSTHETIC HOUSE OFFICER; duties to commence about 28th June, 1955.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Hogarth Radio-THERAPY CENTRE. A vacancy exists at the above Centre for a SENIOR HOUSE OFFICER in Radiotherapy or REGISTRAR (if in possession of Part I, D.M.R.T.) in Radiotherapy. The Centre is recognised as a Training School for both Part I and II D.M.R.T. (Royal Colleges of London) in conjunction with the University of Nottingham, and instruction for this examination can be given to those interested and suitable. The position offers excellent experience for persons studying for other post-graduate degrees.

Apply as soon as possible, stating age, qualifications and experience, together with names of 3 referees, to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Resident House PHYSICIAN (pre-registration first or second post) required for 19th June for 6 months.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Resident House SURGEONS (pre-registration first or second post) required for 19th June and 28th June for 6 months. Recognised for F.R.C.S.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. E.N.T. Depart-MENT. Applications are invited for the post of SENIOR E.N.T. HOUSE OFFICER for the above Hospital. This appointment is recognised for the D.L.O. and the F.R.C.S. examinations. Salary and conditions of service in accordance with Ministry regulations. Duties to commence as soon as possible. Although the post is normally resident, consideration will be given to any applicant who desires to live out.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM AND MIDLAND EYE INFIRMARY. Required, SENIOR HOUSE OFFICER, duties to commence on 30th June. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds. Recognised for the D.C.H.) RESIDENT SENIOR HOUSE OFFICER (surgical) required immediately.

Applications, with copies of 2 testimonials, to the Hospital Secretary.

NOTTINGHAM. CITY HOSPITAL. (804 Beds.) Applica-tions are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer), vacant early July. The post is recognised for the D.A. and the F.F.A.R.C.S. and offers wide experience; this is a busy general hospital with Departments in General, Orthopædic, Gynæcological, Thoracic, and Plastic Surgery.

Applications, stating age, nationality and qualifications, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NEWCASTLE REGIONAL HOSPITAL BOARD.

Newcastle upon Tyne Hospital Management Committee

REGISTRAR ANÆSTHETIST (whole-time), to commence 1st September, 1955.

REGISTRAR PHYSICIAN (whole-time), Medical Clinic No. 2.

Single accommodation available, married accommodation may be available.

Tees-side Hospital Management Committee

REGISTRAR ANÆSTHETIST (whole-time), resident, or non-resident near main hospital. Single accommodation available.

Gateshead Hospital Management Committee

REGISTRAR PHYSICIAN (whole-time). Single accommodation available.

South Shields Hospital Management Committee

REGISTRAR SURGEON (whole-time). Married or single accommodation available.

Durham Hospital Management Committee

REGISTRAR OBSTETRICIAN AND GYNÆCOLOGIST (whole-time).

REGISTRAR SURGEON (whole-time), to commence 1st September, 1955.

Single accommodation available, married accommodation may be available.

Applications, with names and addresses of 3 referees or testimonials, to Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days.

OTLEY, YORKSHIRE. THE GENERAL HOSPITAL. ILKLEY AND OTLEY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER in General and Orthopædic Surgery. 50 surgical beds in a 170-Bedded hospital with full Consultant staff who are members of the Teaching Staff of Leeds University. Duties to commence as soon as possible.

Applications, stating full particulars of age, nationality and experience, together with the names of 2 referees, to the undersigned as soon as possible. E. W. BEST, Group Secretary.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of REGISTRAR in Dermatology and Venereology to the hospitals of the Northampton and Kettering Hospital Management Committees. The appointment will be for 1 year and eligible for extension for a second year. The successful candidate may live in or near the Northampton General Hospital.

Applications on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 25th June.

OXFORD. LITTLEMORE (MENTAL) HOSPITAL. Applications invited for the post of SENIOR HOUSE OFFICER. Previous experience as House Surgeon or Physician essential. Previous psychiatric experience unnecessary. The Physician appointed will work primarily in the Insulin Therapy Clinic and with a Senior Consultant at outpatient clinics. There are ample facilities for postgraduate study in a teaching general hospital. Salary £745 p.a.

Apply Physician-Superintendent.

OXFORD. UNITED OXFORD HOSPITALS. Applications invited for the post of NON-RESIDENT REGISTRAR to the Department of Radiotherapy, Churchill Hospital, Oxford, commencing 1st July, 1955. Training includes clinical use of radioactive isotopes as well as other forms of radiotherapy. Recognised as training centre for D.M.R.T. Previous experience not essential.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 13th June, 1955.

OXFORD. UNITED OXFORD HOSPITALS. Applications invited for post of NON-RESIDENT REGISTRAR in Pathology at the Radcliffe Infirmary with effect from 1st September, 1955.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 18th June, 1955.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited for the following resident House Officer appointments vacant on 1st August, 1955, unless otherwise stated :—

Radcliffe Infirmary

1 JUNIOR RESIDENT PATHOLOGIST (Senior House Officer)—1st September, 1955.

1 EMERGENCY OFFICER (Senior House Officer grade for suitable applicant).

Churchill Hospital

1 SENIOR HOUSE OFFICER AND RESIDENT MEDICAL OFFICER.

1 SENIOR HOUSE PHYSICIAN.

1 JUNIOR RESIDENT PATHOLOGIST (Senior House Officer)—1st September, 1955.

Cowley Road Hospital (Geriatric Unit)

2 SENIOR HOUSE PHYSICIANS.

Osler Hospital (T.B. Unit)

1 RESIDENT MEDICAL OFFICER.

T.B. Meningitis Unit

1 SENIOR HOUSE PHYSICIAN.

Applications, stating age, experience, and qualifications, together with names of 2 referees, to Administrator, Radcliffe Infirmary, Oxford, to arrive not later than Monday, 20th June, 1955.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICER to Casualty and Traumatic Department, Freedom Fields Section, vacant 3rd August, 1955.

SENIOR HOUSE OFFICER in Surgery, Greenbank Road Section, vacant 1st August, 1955. Recognised for the F.R.C.S.

SENIOR HOUSE OFFICER in Surgery, Devonport Section, vacant 21st August, 1955. Recognised for the F.R.C.S.

HOUSE SURGEONS (pre-registration posts), vacancies immediately, 1st June, 1st July, 1955, Greenbank Road Section. Recognised for the F.R.C.S.

HOUSE SURGEONS (pre-registration posts), Freedom Fields Section, vacancies (2) 1st July, 1955. Recognised for the F.R.C.S.

HOUSE SURGEON, Devonport Section, vacant 1st June, 1955.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 174,000. Recognised for M.R.C.O.G., D.Obst.R.C.O.G., F.R.C.S., D.C.H., F.F.A.R.C.S., D.A.) PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE.

SENIOR HOUSE OFFICER (pædiatrics), to commence 1st August, 1955.

SENIOR HOUSE OFFICER (surgical), to commence 24th July, 1955.

SENIOR HOUSE OFFICER (anæsthetics), to commence 25th August, 1955.

2 SENIOR HOUSE OFFICERS (medical), to commence 1st August, 1955, to include duties at Llwynypia Hospital.

HOUSE OFFICERS (medical), to commence 1st August, 1955.

HOUSE OFFICER (pædiatrics), to commence 1st August, 1955.

HOUSE OFFICERS (obstetrics), to commence 1st August, 1955.

HOUSE OFFICERS (surgical), to commence 1st August, 1955, to include duties at Porth and District Hospital.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Courthouse-street, Pontypridd.

POOLE GENERAL HOSPITAL, Poole, Dorset. (320 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (pre-registration) required 17th June, 1955. The Hospital is recognised for the F.R.C.S. and F.R.C.S.E.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary.

REDHILL. EAST SURREY HOSPITAL, Shrewsbury-road. (139 Beds.) HOUSE SURGEON (Male) required—pre-registration post.

Apply to the Hospital Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (401 Beds.) Applications are invited from registered medical practitioners only for the resident post of JUNIOR HOUSE SURGEON (gynæcology), vacant immediately and tenable for 6 months.

Write, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to the Secretary.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN posts available at Birch Hill Hospital mid-July and early August. Pre-registration candidates eligible.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON post now available at Rochdale Infirmary and similar post at Birch Hill Hospital falls vacant early July. Pre-registration candidates eligible for these posts which are recognised for 6 months F.R.C.S. experience.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

ROCHFORD, ESSEX. GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric and Psychiatric Units at the above Hospital. A wide range of facilities are available at the Hospital for the investigation, treatment and rehabilitation of acute and chronic cases. Possibility of furnished or unfurnished accommodation available for married applicants.

Applications stating age, &c., to be sent to the undersigned by 11th June, 1955. J. C. FIELD, Secretary.

Management Committee Offices, General Hospital,
Rochford, Essex.

ROCHFORD, ESSEX. GENERAL HOSPITAL. Applications are invited from pre-registration candidates for a 6-month appointment of HOUSE SURGEON (recognised for F.R.C.S.) at the above Hospital to be followed, subject to satisfactory service, by a 6-month Resident House Officer appointment in the Obstetric and Gynæcological Department (recognised for D.Obst.R.C.O.G.). Post vacant mid-June.

Applications, accompanied by 1 testimonial, to reach the undersigned by 8th June, 1955. J. C. FIELD, Secretary.

Management Committee Offices, General Hospital, Rochford.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE SURGEON (Male) required. (Post not approved for pre-registration purposes.)

Applications should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROTHERHAM. DONCASTER GATE HOSPITAL (161 Beds), MOORGATE GENERAL HOSPITAL, ROTHERHAM (355 Beds, 38 Cots). Locum SENIOR HOUSE OFFICER (Casualty, E.N.T., and Eye Departments). Residential emoluments £140 p.a.

Applications to the Secretary, Hospital Management Committee, "Fern Bank," Doncaster-road, Rotherham.

SALFORD, 6, LANCASHIRE. HOPE HOSPITAL. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of SURGICAL SENIOR HOUSE OFFICER, vacant in July and recognised for the F.R.C.S. England.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, to the Secretary.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE SURGEON (Orthopædic Department) which is open to pre-registration candidates, and which becomes vacant immediately. The Department has 35 Beds and a large outpatient turnover.

Applications, stating age, nationality, qualifications, experience, and naming 2 referees, to the Group Secretary, Odstock Hospital, Salisbury.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications are invited for the following posts at the Royal Infirmary Unit :—

(*a*) NON-RESIDENT REGISTRAR to the Department of Dermatology. Previous experience desirable but not essential.

(*b*) RESIDENT SENIOR HOUSE OFFICER in Clinical Pathology. Post vacant 19th July. Pathological experience not essential, but candidates must have previous clinical experience. The successful candidate will work in turn in the different branches of clinical pathology in the laboratories of The United Sheffield Hospitals.

Applications for the above posts should state age, qualifications and experience, give the names of 3 referees, and be sent immediately to the following :—

For post (*a*)—The Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

For post (*b*)—The Superintendent, Royal Infirmary, Infirmary-road, Sheffield, 6.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in the Child Guidance Department, Royal Hospital for Sick Children, Edinburgh. The post is designed to afford facilities for further training for individuals interested in pædiatrics or psychiatry.

Applications, giving particulars of age, previous experience and qualifications, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 25th June, 1955.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Surgery at the Royal Infirmary of Edinburgh.

Applications, giving particulars of age, qualifications, and previous experience, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 25th June, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

SENIOR REGISTRAR in Radiotherapy based at the Western Infirmary, Glasgow.

SENIOR REGISTRAR in Bacteriology based at Stobhill Hospital, and with duties at Ruchill Hospital, Glasgow.

REGISTRAR in Bacteriology based at the Western Infirmary, Glasgow.

2 REGISTRARS in Medicine based at the Royal Infirmary, with duties for a period, if required, at Belvidere I.D. Hospital, Glasgow.

REGISTRAR in Tuberculosis based at Robroyston Hospital, Glasgow.

REGISTRAR in Ophthalmology based at the Eye Infirmary, Glasgow.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 2nd July, 1955.

SHREWSBURY. EYE, EAR AND THROAT HOSPITAL. SHREWSBURY HOSPITAL GROUP. SENIOR HOUSE OFFICER (E.N.T.), vacant 1st August, 1955. Duties at E.N.T. Hospital (68 Beds) and Copthorne Hospital (168 Beds). Post recognised for the D.L.O.R.C.S.

Applications, with copy testimonials, to the Group Secretary, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY, CHILDREN'S UNIT. SHREWSBURY HOSPITAL GROUP. SENIOR HOUSE OFFICER or HOUSE OFFICER (pædiatric), vacant immediately. The Unit consists of medical, surgical and fever beds.

Applications, with copy testimonials, to Group Secretary, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY. (241 Beds.) SHREWSBURY HOSPITAL GROUP. HOUSE SURGEON for general surgical duties (pre-registration post), vacant immediately.

Applications with copy testimonials to Group Secretary, Royal Salop Infirmary, Shrewsbury.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (casualty) required, 1 of 2, for busy Casualty Department. Experience provided in orthopædic and plastic cases.

Applications, stating age and qualifications, with copies of 2 testimonials, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required, pre-registration post, vacant now.

Applications, stating age and qualifications, with names of 2 referees, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum RESIDENT ANÆSTHETIC REGISTRAR required 22nd June–19th July inclusive.

Applications, stating age and qualifications, with 2 testimonials, to Hospital Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum HOUSE PHYSICIAN required, pre-registration post, from 6th to 18th June, inclusive.

Applications, stating age and qualifications, with names of 2 referees, to Hospital Secretary.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) CASUALTY OFFICER (Registrar grade) required for the above Hospital. Post recognised for the F.R.C.S. regulations, and preference will be given to such candidates. Appointment tenable for 6 months for approximately 18th July, 1955, and subject to review at the end of this period.

Application forms obtainable from, and returnable to, Group Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, by 13th June, 1955.

SOUTHAMPTON CHEST HOSPITAL. (261 Beds.) SENIOR HOUSE OFFICER required from 3rd June, to be responsible for Infectious Diseases Unit. The duties are such as to suit a candidate reading for higher examinations. The Unit is sited at a Hospital possessing up-to-date tuberculosis and thoracic surgical units, whilst the Southampton Group of hospitals as a whole affords excellent opportunities for study and experience in all branches of medicine.

Applications, together with copies of recent testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON CHEST HOSPITAL. South West METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR required for Thoracic Unit (80 surgical beds) at above Hospital. Candidates should possess higher qualifications and should preferably, but not necessarily, have had previous experience of thoracic surgery. The Hospital may be visited, if desired, by prior arrangement.

Application forms may be obtained from the undersigned, to whom they should be returned, when completed, by 15th June, 1955. FRANK JENNINGS, Secretary,

Southampton Group Hospital Management Committee.
Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (471 Beds.) RESIDENT HOUSE PHYSICIAN required from 2nd July. Pre-registration candidates eligible.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (471 Beds—87 surgical.) 2 HOUSE SURGEONS required middle and end of June, 1955. Posts tenable for 6 months. Both recognised for F.R.C.S. and Pre-registration Service.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of Whole-time RADIOLOGICAL (DIAGNOSTIC) REGISTRAR at the above Hospital. Previous experience essential. The appointment entails duties at other hospitals in the Group. Candidates may visit the Hospital if they so desire.

Forms of application, obtainable from the undersigned, should be returned not later than 13th June, 1955.

FRANK JENNINGS, Secretary,
Southampton Group Hospital Management Committee.
Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL (278 Beds) AND SOUTHAMPTON GENERAL HOSPITAL (471 Beds). SENIOR HOUSE OFFICER (E.N.T.) required in June. This post is recognised for the F.R.C.S. (Eng.) and D.L.O. examinations and provides experience in all branches of E.N.T. work, including audiometry. The Group includes a diagnostic and distributing hearing-aid centre.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in General Surgery to fill a vacancy in the approved trainee establishment at the Bromley Group of hospitals, available on 12th August, 1955. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 18th June, 1955.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Ophthalmology to fill a vacancy in the approved trainee establishment at the Brighton and Lewes Group of hospitals, for duties mainly at the Sussex Eye Hospital, Eastern-road, Brighton, 7. The post is recognised for the F.R.C.S. and D.O. and may be either resident or non-resident ; no accommodation is available for a married practitioner. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 18th June, 1955.

SOUTHEND GENERAL HOSPITAL. Applications are invited from registered or provisionally registered practitioners for appointment as RESIDENT GENERAL HOUSE PHYSICIAN. Post vacant 1st July, 1955. Salary according to previous appointments held, less the prescribed charge for residential emoluments.

Applications, stating age, qualifications and previous experience, with copies of recent testimonials (1 testimonial sufficient from applicants for first appointment), to reach the undersigned by 8th June, 1955. J. C. FIELD, Secretary.

SOUTHEND GENERAL HOSPITAL. Applications are invited from registered or provisionally registered practitioners for appointment as RESIDENT HOUSE SURGEON. Post vacant 1st July, 1955. Salary according to previous appointments held, less the prescribed charge for residential emoluments.

Applications stating age, qualifications and previous experience, with copies of recent testimonials (1 testimonial sufficient from applicants for first appointment), to reach the undersigned by 9th June, 1955. J. C. FIELD, Secretary.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds—Recovery Unit 32 Beds.) HOUSE PHYSICIAN (pre-registration post), vacant July.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds—Recovery Unit 32 Beds.) HOUSE SURGEON (pre-registration post), vacant July.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STOCKPORT INFIRMARY, Stockport. (162 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Assistant Resident Surgical Officer), general and orthopædics. The post is recognised for the F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (pædiatrics) required, vacant July. Recognised pre-registration.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (general surgery) required, vacant July. Recognised F.R.C.S., examination, and pre-registration.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. SENIOR HOUSE OFFICER (E.N.T.) required, vacant now.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (orthopædics) required, vacant now. Recognised F.R.C.S.

Detailed applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (medical) required. Post vacant July. Recognised pre-registration.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. SENIOR HOUSE OFFICER (ophthalmology) required. Recognised F.R.C.S. and D.O.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SWANSEA HOSPITAL, Swansea. Glantawe Hospital MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the appointment of SENIOR HOUSE OFFICER in the Ophthalmic Department of the above Hospital. The post is recognised for the F.R.C.S. (Eng.) and D.O. examinations.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be addressed to the Hospital Secretary.

SWANSEA. MORRISTON HOSPITAL. (501 Beds.) GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident appointment of SENIOR HOUSE OFFICER in the Anæsthetic Department of the above General Hospital, which is also the Regional Centre for neurosurgery, thoracic and dental surgery. The post is recognised for the F.F.A.R.C.S. and D.A. examinations.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be addressed to the Medical Superintendent.

SWINDON HOSPITAL GROUP. (507 Beds.) Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER as Casualty Officer and Orthopædic House Surgeon at Great Western Hospital, Swindon. Post recognised by R.C.S. for 6 months of year's training under Fellowship regulations. Work of Accident and Orthopædic Department, associated with Wingfield-Morris Orthopædic Hospital, Oxford, includes large number of industrial injuries. Salary £745 p.a., less £145 p.a. for residential emoluments.

Full details and names of 3 referees to Secretary, 7, Okus-road, Swindon, as soon as possible.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. Applications invited for post of HOUSE PHYSICIAN to the Special Unit for Research in Juvenile Rheumatism, vacant 15th July. Post offers scope for those interested in research, pædiatrics, rheumatology or cardiology.

Applications, stating age, qualifications and experience with dates, with copies of 2 testimonials, to Hospital Secretary.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR (general medicine), Bridgend General Hospital, Bridgend (381 Beds). Resident/non-resident.

REGISTRAR (psychiatry), Morgannwg Hospital, Bridgend (all modern treatments, active outpatient clinics, Child Guidance Clinic and Psychological Department). Accommodation available.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens REGISTRAR (neurosurgery) required Morriston Hospital, near Swansea, June, 1955—January, 1956.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

WELSH REGIONAL HOSPITAL BOARD. Registrar (general medicine), based at Caerphilly District Miners' Hospital, Caerphilly. Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WELSH REGIONAL HOSPITAL BOARD. Registrar (general surgery), based West Wales General Hospital, Carmarthen. Resident. Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WESTCLIFF HOSPITAL, Balmoral-road, Westcliff-on-SEA, ESSEX. Applications are invited for the post of RESIDENT HOUSE MEDICAL OFFICER (Senior House Officer grade) at Westcliff Hospital. Post vacant 1st July, 1955. The Hospital deals with communicable diseases, general medicine and tuberculosis. The appointment covers a wide field of medicine and offers excellent training for general practice.

Applications to be sent to the Secretary at the General Hospital, Prittlewell-chase, Southend-on-Sea, Essex, not later than 9th June, 1955. J. C. FIELD, Secretary.

WHITEHAVEN HOSPITAL, Cumberland. (124 Beds, plus 27 beds in Annexe.) HOUSE SURGEON, with orthopædic and casualty duties. (Recognised pre-registration, Senior House Officer grade if appropriate.) Vacant now.

Detailed applications, with dates and copies of 2 testimonials, to Group Secretary, Workington Infirmary, Cumberland.

WHITEHAVEN HOSPITAL, Cumberland. (124 Beds and Annexe of 27 Beds.) HOUSE OFFICER (obstetrical and gynæcological), House Officer or Senior House Officer grade, vacant 1st July.

Detailed applications, with dates and copies of 2 testimonials, to Secretary.

WOKINGHAM. PINEWOOD HOSPITAL. Registrar in Diseases of the Chest required at above Hospital. Hospital has 248 Beds and contains a Thoracic Surgical Unit. Post gives valuable experience in medical and surgical treatment of pulmonary tuberculosis and is suitable for a candidate working for higher qualification. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Windsor Group Hospital Management Committee, Almaroad, Windsor, by 17th June.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (198 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital. This is a pre-registration post. Salary according to the National Health Service scale.

Applications, with copies of recent testimonials, to the Administrator.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (198 Beds.) Applications are invited for the post of CASUALTY AND ORTHOPÆDIC HOUSE SURGEON. Salary according to National Health Service scale.

Applications, with copies of 2 testimonials, to the Administrator.

WOLVERHAMPTON GROUP.

The Royal Hospital (an Associated Hospital of the University of Birmingham Medical School)

HOUSE OFFICER (casualty), vacant 9th June.
HOUSE OFFICER (E.N.T. Department), vacant 7th July.
SENIOR HOUSE OFFICER or HOUSE OFFICER (Fracture and Orthopædic Department), vacant June.
•2 HOUSE OFFICERS (general medicine), vacant July.
•3 HOUSE OFFICERS (general surgery), vacant July.
•HOUSE OFFICER (pædiatric), vacant 16th July.

• Approved for Pre-registration Service.

Apply, with copies of testimonials, to Secretary, The Royal Hospital, Wolverhampton.

WOLVERHAMPTON. ROYAL HOSPITAL. Resident PATHOLOGIST (Junior Hospital Medical Officer) required. Post vacant 31st August. Applicants may visit the Hospital.

Apply to Secretary by 18th June.

WREXHAM (near). TREVALYN MANOR MATERNITY HOSPITAL, ROSSETT. (47 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital to commence 1st July, 1955. The Hospital is recognised by Central Midwives Board as a Part II Midwifery Training School and deals with normal and abnormal midwifery.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

YORK A AND TADCASTER HOSPITAL MANAGE-MENT COMMITTEE.

County and City Hospitals

2 SENIOR HOUSE SURGEONS (resident), permanent or locum, required immediately. Recognised for F.R.C.S. Wide experience offered.

County Hospital

SENIOR HOUSE SURGEON in Ophthalmology required, 12th June, 1955.

(Acute General Hospitals in York of 269 and 265 Beds respectively, with full Consultant staff.)

Applications, giving qualifications, age, experience, nationality and names of 2 referees, to the Secretary, York A and Tadcaster Hospital Management Committee, Bootham Park, York.

YORKSHIRE. EAST RIDING HOSPITAL MANAGE-MENT COMMITTEE.

Westwood Hospital, Beverley, Yorks (220 Beds)

ORTHOPÆDIC HOUSE SURGEON (first, second, or third post). Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S.

Apply to Group Secretary.

CHANNEL ISLANDS, JERSEY. GENERAL HOSPITAL. Applications are invited for the post of CASUALTY OFFICER which will be vacant on 1st August, 1955, in the above Hospital. The appointment is for 6 months but is renewable for a further 6 months. Salary £475 p.a., less £125 for residential emoluments.

Applications to be submitted not later than 11th June, 1955, to the President, Public Health Committee, General Hospital, Jersey, C.I.

CHANNEL ISLANDS, JERSEY. GENERAL HOSPITAL. A vacancy for a MEDICAL OFFICER will exist on 16th July, 1955. Applications are invited to fill the post on or as soon after this date as possible. The appointment is for 6 months but is renewable for a further 6 months. Salary £575 p.a., less £125 for residential emoluments.

Applications to be submitted not later than 11th June, 1955, to the President, Public Health Committee, General Hospital, Jersey, C.I.

U.S.A. UNION HOSPITAL, Fall River, Massachusetts, U.S.A. (207 Beds.) Applications invited for INTERNSHIPS. Rotating Intern Training Programme approved by A.M.A. Salary $100 per month, first 6 months ; $150 per month, second 6 months. Plus full maintenance. A representative of the Hospital will be in England during July, 1955, and will be available for interviews.

Apply Administrator.

Public Appointments

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1

District	*County*	*Latest date for receipt of applications*
ASCOT	BERKS	18TH JUNE, 1955

BARBADOS GENERAL HOSPITAL. A Medical Officer is required at the General Hospital, Barbados. Duties are general and those ordinarily performed in a large acute general hospital of 336 beds, including medicine, surgery, obstetrics, theatre and ward work, anæsthetics, casualty, outpatients and other departmental duties as may be directed. Candidates must possess qualifications registrable in the United Kingdom. Appointment will be on agreement for 3 years. Salary scale is $3600–$4800 (£750–£1000) a year, starting salary depending upon candidate's age and experience. A temporary cost-of-living allowance of $156 (£32 10s.) p.a. is also payable. Free furnished quarters are provided. Free passages to Barbados are provided for the Officer, wife and children on first appointment and back to the United Kingdom on the satisfactory completion of the agreement, subject to a total maximum cost of $1440 (£300) each way. Income-tax at local rates. Social and recreational amenities are good. Climate is healthy for Europeans. Educational facilities are available.

Application forms can be obtained from the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 117/28/02).

DUBLIN. LOCAL APPOINTMENTS COMMISSION. Medical positions vacant.

(1) PHYSICIAN-SUPERINTENDENT, Limerick County Council. Essential qualifications include the M.D., M.R.C.P.I., or equivalent. Salary: £1775 with permission to engage in limited private practice. The duties of the Office will be performed mainly in the Regional Hospital, Limerick.

(2) SURGEONS (*a*) Tipperary (N.R.) County Council; (*b*) Louth County Council; (*c*) Wexford County Council. Salary: (*a*) £1305; (*b*) £1415; (*c*) £1415, with permission to engage in limited private practice in each case.

Application forms and particulars from the Secretary, 45, Upper O'Connell-street, Dublin. Latest time for receiving completed application forms 5 P.M. on 17th June, 1955.

HOME OFFICE CIVIL DEFENCE TRAINING SCHOOLS. The Civil Service Commissioners invite applications from experienced registered medical practitioners aged 28 or over on 1st May, 1955, for 3 permanent posts as MEDICAL OFFICER. Interviews in London. Duties include instruction in medical aspects of nuclear, biological, and chemical warfare, and advising on programmes of instruction and the precautions to be taken to safeguard students' health during demonstrations involving gas, radioactivity, smoke and heat. Candidates must also be experienced Lecturers, and should have some knowledge of the effect of modern warfare and the precautionary measures to be taken to keep casualties as low as possible. Starting salary (London) from £1535 at age 35 (lower for those under 35) to £1900 at 40 or over, rising to £2100. Slightly lower outside London. Non-contributory pension and gratuity.

Particulars and application form from Secretary, Civil Service Commission, 6, Burlington-gardens, London, W.1, quoting No. 4473/55. Application forms to be returned by 25th June, 1955.

KENYA. MEDICAL DEPARTMENT. Applications are invited for appointment as HOUSEMEN at the King George VI Hospital, Nairobi. Appointment will be on agreement for 1 year in the capacity of a House Physician and House Surgeon. Applicants must have completed their National Service or not be liable for it. These posts are recognised for pre-registration training by the University of London and certain other Licensing Bodies but candidates should confirm from their Licensing Bodies that these posts are acceptable to them for the purposes of the Medical Act, 1950. Consolidated salary £570 a year for the first 6 months and £630 a year for the second 6 months. Income-tax at local rates. Furnished quarters including linen, cutlery and glassware together with light, fuel and water are provided free of charge. Married quarters are not provided, married candidates may not be accompanied by their wives. Free passages are provided on appointment and on satisfactory completion of internship. 18 days local leave a year is granted. If the selected candidate applies for and obtains appointment to the Medical Branch of Her Majesty's Oversea Civil Service in Kenya at the expiration of his internship, previous service as Resident Medical Officer will count for leave but he will be required to serve the usual probationary period. The period of internship will not count for seniority. Ample opportunities for clinical experience with systematic teaching and a large measure of personal responsibility under specialist guidance are afforded.

Candidates should apply for forms of application to the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 117/7/03).

LAGOS TOWN COUNCIL, Nigeria. Assistant Medical OFFICER OF HEALTH required. Salary £770 rising to £1500 plus £100 a year staff pay and expatriation pay of £180 rising to £350 a year. Point of entry depends on the applicant's qualifications and experience. Free passages for officer and wife. Assistance towards cost of children's passages or grant up to £150 annually for their maintenance in United Kingdom. Liberal leave on full salary after each tour of 12–24 months duration. Outfit allowance up to £60 in certain cases. Candidates must be registered medical practitioners. The duties of the office, which are full time, consist mainly of the control of infectious diseases, health education, antenatal and child welfare work and such other duties as the Medical Officer of Health may allocate. Opportunities will be provided for postgraduate training in public health works. Applicants must disclose whether they are related to any Councillor or Senior Officer of the Council. Canvassing will be treated as evidence that the applicants merits alone are insufficient to justify appointment.

Write to the Crown Agents, 4, Millbank, London, S.W.1, enclosing at least 2 copies of recent testimonials. State age, name in block letters, full qualifications and experience and quote M3A/34355/LD.

METROPOLITAN WATER BOARD. Applications are invited from registered medical practitioners under 40 years of age for the position of MEDICAL ASSISTANT to assist the Director of Water Examination in matters of public health relating to water supplies. A Degree in Public Health and an interest in bacteriology is desirable. The appointment is whole-time and the duties will also include matters for special research or other work as required from time to time by the Director. The commencing salary will be within the range of £1260–£1430 p.a. according to age and experience, progressing by annual increments to £1870 p.a. The selected candidate will be required to pass a medical examination by the Board's Chief Medical Officer and to undertake in writing to join the Board's Superannuation and Provident Fund. Pensionable service under the Local Government Superannuation Act, 1937, the Local Government Superannuation (Scotland) Act, 1937, or under the Local Government and Other Officers (Superannuation) Act, 1922, may under certain conditions be counted as pensionable service with the Board.

Applications, stating age, present position and salary, qualifications and experience, and giving the names of 2 referees, should be addressed to the undersigned, endorsed "Medical Assistant" and must reach him not later than 10 A.M. on 30th June, 1955. Canvassing disqualifies and relationship to any member, officer or employee of the Board must be disclosed.

W. S. CHEVALIER, Clerk of the Board.

Offices of the Board, New River Head,
Rosebery-avenue, E.C.1.

ROTHERHAM. COUNTY BOROUGH OF ROTHERHAM. Applications are invited from registered medical practitioners (male) for the post of DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER at a salary within the consolidated range of £1166 13s. 4d., rising by 5 annual increments of £50 to £1416 13s. 4d. (subject to increase on receipt of Medical Officers' award). The commencing salary will be determined at a point within the scale, having regard to the experience of the successful candidate. Applicants must possess a D.P.H. and have had previous experience in school health, maternity and child welfare, and general public health work. The person appointed will be responsible, under the direction of the Medical Officer of Health, for carrying out administrative and other duties in all sections of the work of the Health Department, and must be capable of assuming full responsibility for the department when necessary. The appointment is whole-time, and the successful candidate will not be allowed to engage in private practice. The appointment will be terminable at any time by 3 months notice in writing on either side and will be subject to the Medical Whitley Council's General Conditions of Service for Public Health Medical Officers. The appointment is also subject to the approval of the successful candidate by the Minister of Education under the School Health Service and Handicapped Pupils Regulations 1953. The successful candidate will be required to pass a medical examination for superannuation purposes. The tenancy of a 3-bedroomed house is available, if required.

Forms of application may be obtained from the Medical Officer of Health, Municipal Offices, Rotherham, and must be returned to the undersigned, giving the names of 3 referees, and endorsed "Deputy Medical Officer of Health," by 13th June, 1955. Every application must state whether the candidate is related to any member or officer of the Rotherham County Borough Council and deliberate omission to disclose any such relationship will disqualify the candidate. Canvassing of members of the Council whether direct or indirect will disqualify any candidate. JOHN S. WALL, Town Clerk.

Municipal Offices, Rotherham.

ROYAL AUSTRALIAN NAVY

MEDICAL OFFICERS

Applications are invited from legally qualified medical practitioners for appointment as Surgeon Lieutenants in the Royal Australian Navy. First appointment is for a period of 4 years with prospect of transfer to the Permanent Naval Force or alternatively an extension of short service up to a maximum of 8 years with gratuity payable pro rata.

Minimum yearly emoluments on appointment are—married officers £1694, single officers £1479.

All money figures quoted are Australian currency, but payment of the above rates will be made in sterling currency until departure from the United Kingdom. First class "D" grade passage, including wife and family to Australia at government expense. Uniform gratuity of £224 5s. is paid on entry.

Increment of £95 is payable on completion of 2 years service.

A gratuity of £500 will be paid for 4 years service. If a 4-year commission is extended, gratuity will accrue pro rata.

Medical Officers serve in Royal Australian Navy hospitals, ships and establishments in Australia or abroad.

The Naval Hospitals at Balmoral (New South Wales) and Flinders (Victoria) are recognised as training schools for resident Medical Officers.

General leave is allowed, and free travel warrants in Australia to visit next of kin are given under specified conditions.

Retirement provisions and invaliding benefits are provided by contributions to the Defence Forces Retirement Benefits Fund. These contributions are refunded if taking discharge (other than on Medical grounds) at end of short-service commission.

Full details may be obtained from the R.A.N. Liaison Officer, Australia House, Strand, London, W.C.2, or from the Secretary, Department of the Navy, Melbourne, S.C.1, Australia.

LANCASHIRE COUNTY COUNCIL. Registered medical practitioners required for appointment of ASSISTANT DIVISIONAL MEDICAL OFFICER in Chadderton, Fleetwood, Lytham St. Annes and Leigh. Possession of D.P.H. desirable. Salary £975–£1375 p.a. Travelling and subsistence allowances where applicable.

Application forms and further particulars from County Medical Officer of Health, Serial 157, East Cliff County Offices, Preston.

SUDAN GOVERNMENT. The Ministry of Health, Sudan Government, invites applications for the following posts :—

MEDICAL ENTOMOLOGIST. Candidates must have Honours Degree and must be fully literate in either Arabic or English. Age limits 22–45 years. Salary range from £E1075 to £E2330 p.a.

MEDICAL PATHOLOGIST. Candidates must have Honours Degree and must be fully literate in either Arabic or English. Age limits 22–45 years. Salary range from £E1750 to £E2330 p.a. (for Junior Specialist) or a fixed salary of £E2500 p.a. (for Specialist).

ANALYTICAL CHEMIST. Duties are in the Government Analyst's Laboratory in Khartoum and include the analysis of waters, foods, drugs, dairy produce and certain clinical specimens, toxicology, forensic chemistry and general miscellaneous analysis, including minerals and Metolo. Some opportunities for research are open to the keen worker. Candidates should possess a good Honours Degree in Chemistry or A.R.I.C. and should have had several years postgraduate experience, preferably in general analytical work. Age limits 26–32 years. Salary range from £E1075 to £E2330 p.a.

BACTERIOLOGISTS. Candidates should have specialist experience in Bacteriology, and in a reputed Institute. Salary range from £E1750 to £E2330 p.a. (for Junior Specialist) or a fixed salary of £E2500 p.a. (for Specialist).

All the above appointments will be on short-term contract for a period of up to 5 years and starting rates of pay will be determined according to age, experience and qualifications. In certain cases a cost-of-living allowance is also payable at present. A bonus of 1 months salary is payable, on satisfactory completion of the contract, for each year of service. Outfit allowance of £E50 is payable when the contract is signed. Free passage on appointment. Annual leave after the first tour.

Further particulars and application form may be obtained from Dr. E. P. PRATT, 93, Harley-street, London, W.1. Please mention the appointment concerned and give name and address in block letters.

WARRINGTON. COUNTY BOROUGH OF WARRINGTON. Appointment of DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER. Applications are invited from registered medical practitioners holding a Diploma in Public Health, or equivalent qualification, for the appointment of Deputy Medical Officer of Health and Deputy Principal School Medical Officer. The present salary scale is £1133 6s. 8d.–£50(5) to a maximum of £1383 6s. 8d., subject to review in accordance with Whitley Council agreements.

Conditions of appointment and details of duties may be obtained from the undersigned, to whom applications should be addressed. Applications must be submitted by 22nd June, 1955.

ERIC H. MOORE, Medical Officer of Health and Principal School Medical Officer.

Health Department, Sankey-street, Warrington, May, 1955.

WARWICKSHIRE COUNTY COUNCIL. County Medical OFFICER OF HEALTH'S DEPARTMENT. Applications are invited from registered medical practitioners for the permanent appointment of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH (Male or Female). Preference will be given to those holding the D.P.H. or D.C.H. and with previous experience. Salary and conditions will be in accordance with the Whitley Council. The candidate will be required to provide a motor car in the performance of duties, for which Whitley Council scale allowances are payable.

Further particulars (including details of area and duties) and application forms may be obtained from the County Medical Officer of Health, Shire Hall, Warwick. Closing date for applications is 1st July, 1955.

L. EDGAR STEPHENS, Clerk of the Council.

Shire Hall, Warwick, 26th May, 1955.

SASKATCHEWAN DEPARTMENT OF PUBLIC HEALTH

REGIONAL MEDICAL HEALTH OFFICER required.

Salary range.—$7524–$8688 p.a. Salary recognition is given to those possessing Certification as a Specialist in Public Health from the Royal College of Physicians and Surgeons (Canada).

Requirements.—Applicants should be under 45 years of age ; should have had some medical and administrative experience ; should possess a registerable qualification in medicine for the Province of Saskatchewan, and a Diploma from a recognised School of Public Health.

Duties.—This is a professional medical and administrative post in an area with a population of approximately 50,000. The holder will be required to develop regional preventative health services and a general public health programme.

Benefits.—3 weeks annual vacation with pay ; 3 weeks sick leave, accumulative ; suitable superannuation scheme.

Application forms and details concerning duties and responsibilities may be obtained from the Personnel Officer, Department of Public Health, Provincial Health Building, Regina, Sask., Canada.

TREASURY MEDICAL SERVICE. Applications are invited from medical practitioners, practising in the districts detailed below, for appointment, in a part-time and mainly advisory capacity, as LOCAL TREASURY MEDICAL OFFICER for each of the places or groups of places shown. The town shown in brackets after the place-names indicates the Head Post Office Area in which the place, or group of places, is situated. Successful applicants will be required to examine and report on the condition of certain Government Officers, teachers, candidates for appointment, &c., who may be referred to them from time to time ; and to attend when summoned to an emergency case of accident or sudden illness occurring in a Government office in the neighbourhood. Fees for this work, and mileage allowance where necessary, will be paid on a scale agreed with the British Medical Association.

Intending applicants should write, within 14 days, to Treasury Medical Adviser, Treasury Chambers, Whitehall, S.W.1, for a form on which application may be made. Applicants should be not more than 60 years of age.

The places for which applications are invited are as follows:—

ENGLAND AND WALES

Market Rasen and district (Lincoln).
Reigate and Betchworth (Redhill and Reigate).
Prestatyn (Rhyl).
Haigh and Aspull Moor (Wigan).
Upholland (Wigan).

WORCESTERSHIRE. BOROUGH OF OLDBURY. ASSISTANT COUNTY MEDICAL OFFICER. Applications from registered medical practitioners with D.P.H. are invited for this appointment, which includes certain duties from time to time as Deputy to the Medical Officer of Health of Oldbury. Medical Whitley Council scale salary (£950 rising by £50 to £1300, plus £50 as Deputy).

Application forms from County Medical Officer, County Buildings, Worcester.

K. PEARCE, Town Clerk, Oldbury.
W. R. SCURFIELD, Clerk of the County Council.

Hospital Services : Non-Medical Appointments

BIRMINGHAM ACCIDENT HOSPITAL, Bath-row, BIRMINGHAM, 15. SENIOR MEDICAL LABORATORY TECHNICIAN (Pathology Department). Applicants must have experience in all branches of medical laboratory work. Whitley Council salary and conditions. Further particulars from Consultant Pathologist.

Apply Administrator.

Appointment : Too Late for Classification

WESTON-SUPER-MARE GENERAL HOSPITAL. Resident Locum Tenens HOUSE OFFICER required at the above Hospital for a month from 18th June, 1955.

Applications should be addressed to the Group Secretary, Weston-super-Mare Hospital Management Committee, c/o The Convalescent Hospital, Uphill-road, Weston-super-Mare.

Miscellaneous

To non-professional posts the Notification of Vacancies Order 1952 applies.

For excellent training opportunities and promising careers for Pathologists in the United States of America contact Dr. E. VON HAAM, Chairman, Department of Pathology, Ohio State University Medical Center, Columbus 10, Ohio.

A young British Physician or an advanced medical student gets an opportunity to follow work of a Finnish sanatorium for tuberculosis near Turku, during 1–3 months summer 1955. During this time he or she will have free board.—For further particulars apply to Medical Superintendent HANNES SALMENKALLIO, M.D., Preitilä, Finland.

Consulting-rooms, full and part time, and Houses in the medical area.—ELGOOD & Co., 1, Bentinck-street, W.1 (WELbeck 8874).

To let—Spacious Surgery and adjoining waiting-room. Suitable Dentist, Chiropodist, Masseur, &c.—Particulars from Secretary, WESTMINSTER GENERAL DISPENSARY, 9, Gerrard-street, W.1. (Tel. GER. 3646).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

The Proprietor of British Patent No. 667,744 for "Injector" desires to enter into negotiations with a firm or firms for the sale of the patent or for the grant of licences thereunder.—Further particulars may be obtained from MARKS & CLERK, 57 and 58, Lincoln's Inn-fields, London, W.C.2.

Austin. The New Show Models A.30, A.40, A.50 and A.90. Limited number of orders now acceptable from proven essential users for delivery ahead.—Demonstrations, easy terms, brochures, application forms on request, from 140–144, Golders Green-road, Golders Green, London, N.W.11.

Family Planning Association.

Sub-fertility Centre. Investigation and advice on treatment of sub-fertility problems. Patients accepted only through doctors, hospitals and clinics.

Pregnancy Diagnosis. Specimens of urine accepted for testing (Hogben Test) from doctors, hospitals and clinics anywhere. Results available within 24 hours of receipt of specimen.

Telephone or write for details : Family Planning Association, 64, Sloane-street, London, S.W.1 (SLOane 9112).

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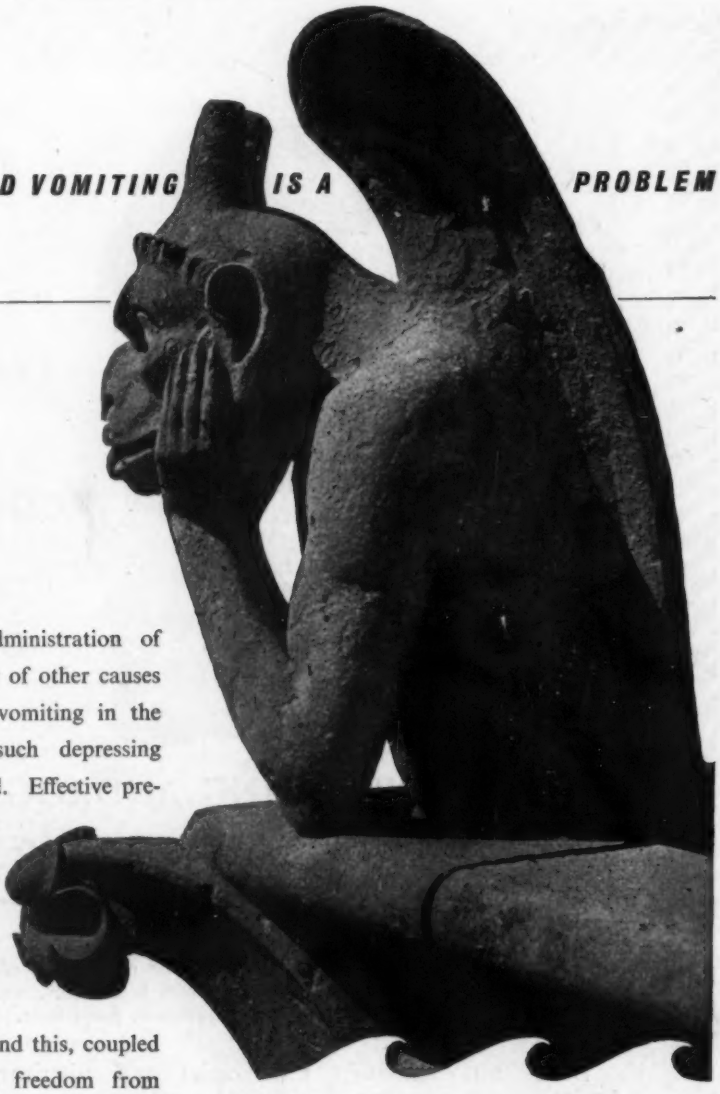
WHEN NAUSEA AND VOMITING IS A PROBLEM



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'Avomine' is effective in small dosage. The drug has a long duration of action, and this, coupled with its low toxicity and freedom from side-effects, makes 'Avomine' a safe form of treatment, even for children.

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